

Smithville Lake
1999 Water Quality Report

1. General.

a. **Project location.** The dam is located at river mile 12.9 on the Little Platte River, a tributary of the Platte River. The drainage area above the dam is 213 square miles. The project is located approximately one mile northeast of Smithville, Missouri.

b. **Authorized project purposes.** Flood control, recreation, water supply, fish and wildlife, and water quality control.

c. Pertinent data.

Pools	Surface Elevation (ft. above m.s.l.)	Current Capacity (1,000 A.F.)	Surface Area (acres)	Shoreline (miles)
Flood Control	876.2	101.7	10,000	
Multipurpose	864.2	139.8	7,190	175
Inactive		47.4*		
Total		241.5		

Total Drainage Area: 213 sq. miles

Average Annual Inflow: 133,248 acre-feet

* Contained in multipurpose pool.

2. Activities and studies of the year.

The Water Quality Unit (PM-PR-W) continued to participate in the multi-agency Little Platte watershed management program during 1999. Having established seasonal and annual variations in the lake's water quality over the period of record dating from 1982, PM-PR-W's objective in the cooperative effort is to define long-term trends, including anticipated improvements in lake water quality following implementation of nonpoint pollution reduction strategies throughout the watershed. PM-PR-W conducted six monthly water quality surveys of Smithville Lake during April-September 1999. *Insitu* profiling of water temperature, dissolved oxygen, conductivity, pH, and oxidation reduction potential (orp) or redox at 1-meter intervals, water collections from surface and bottom strata, and field measurements of secchi and photic zone depths were performed at three lake stations. In addition, ambient measurements and surface water collections were obtained from the outlet and the major tributary. Utilizing its mobile and base laboratories, PM-PR-W performed total suspended solids, turbidity, chlorophyll, fecal coliform, and immunoassay herbicide analyses. Also in support of the cooperative study,

the Chemical and Materials Quality Assurance Laboratory (CMQAL) performed nitrogen and phosphorus group, sulfate, total dissolved and volatile solids, total and dissolved iron, total and dissolved manganese, total and dissolved organic carbon, and gas chromatographic pesticide analyses.

3. Existing conditions.

a. **Inflow.** Excessive turbidity, nutrients, and herbicides associated with storm runoff again were major contributors to the water quality of the Little Platte River at station SM-16 near Plattsburg, Missouri, during the 1999 surveys. Dissolved oxygen (DO) concentrations during the monthly surveys ranged from 5.8 mg/L to 14.9 mg/L, fully meeting the state criterion of a minimum of 5 mg/L to protect warm-water fish species (Appendix, Table 1). The supersaturated conditions again were the result of algal photosynthesis (blooms) in the very eutrophic environment. Turbidity ranged from stained to highly turbid with mean, minimum, and maximum concentrations of 55 NTU, 16 NTU, and 225 NTU, respectively (Table 2). The 1999 suspended solids concentrations paralleled those of turbidity with mean, minimum, and maximum concentrations of 63 mg/L, 20 mg/L, and 247 mg/L, respectively.

The calculated total nitrogen (TN) concentrations comprised of NH₃, NO₂, NO₃, and TKN continued to be highly eutrophic with a mean, minimum, and maximum of 2.84 mg/L, 0.53 mg/L, and 5.84 mg/L, respectively. The 1999 total phosphorus (TP) concentrations also reflected highly enriched conditions with mean, minimum, and maximum of 0.27 mg/L, 0.09 mg/L, and 0.80 mg/L, respectively. Mean annual TP concentrations for the entire period of record have been substantially higher than the EPA generalized stream eutrophy criterion of 0.10 mg/L. Only 12% of the monthly TP concentrations during 1997-1999 were below the eutrophy criterion (Figure 1).

Four common herbicides (atrazine, cyanazine, alachlor, and metolachlor) were detected in elevated concentrations during the first half of the 1999 sampling season, which represented the heavy spring rain runoff period. Atrazine continued to be present in the highest concentrations with 1999 mean, minimum, and maximum of 7.98 ug/L, 1.03 ug/L, and 28.6 ug/L, respectively. Atrazine concentrations exceeded the EPA criterion for the protection of aquatic life (1 ug/L) and the maximum contaminant level (MCL) for drinking water supplies (3 ug/L). The former has been exceeded almost continuously, and the latter has been exceeded during most late spring and early summer periods over the period of record; data for the last three years are presented in Figure 2. The cyanazine 1999 mean, minimum, and maximum concentrations were 0.19 ug/L, 0.08 ug/L, and 0.38 ug/L, respectively, which did not exceed the EPA maximum contaminant level goal (MCLG) of 1 ug/L. Alachlor mean, minimum, and maximum concentrations were well below the 2 ug/L MCL at 0.13 ug/L, <0.05 ug/L, and 0.34 ug/L, respectively. Metolachlor, which does not have an established MCL, had 1999 mean, minimum, and maximum concentrations of 2.69 ug/L, 0.39 ug/L, and 7.00 ug/L, respectively.

b. **Lake.** Smithville Lake exhibited a fairly typical seasonal thermal regime in 1999. As a result of surface warming, the lake was slightly stratified in the April survey period. Temperature differentials between surface and bottom waters at the three lake stations ranged from 1.2 °C in the 14-meter water column near the dam (SM-3) to 3.5 °C in the 8-meter water

column of the upper Little Platte arm (SM-14). Dissolved oxygen concentrations throughout each water column remained at winter highs. The minimum concentration in the bottom strata was 9 mg/L. The upper strata were only slightly warmer (2 to 4 °C) in May than the previous month. Three-degree temperature differentials between surface and bottom waters were present throughout the lake. However, the DO concentrations in the bottom strata had decreased substantially. Stratification in the down lake area was well established by the June survey period with an 8 °C differential between surface and bottom waters in the 15-meter water column. A thermocline was present between 9 and 10 meters. The bottom 6 meters contained less than 1 mg/L DO. The 7-meter water column of the Camp Branch arm exhibited a 2.6 °C differential with no distinct thermocline or oxycline. The upper Little Platte arm exhibited a 3.3 °C differential with a thermocline and oxycline between 2 and 3 meters in June. Dissolved oxygen concentrations were depressed in the bottom half of the water column (<2 mg/L). The intense stratification continued in July with a 9 °C differential between surface and bottom waters in the 15-meter down lake area. The thermocline depth remained unchanged from June. Fifty percent of the water column was essentially anaerobic. In July both arms continued to exhibit substantially lower temperature differentials, since their bottom waters had continued to warm while the deeper waters of the down lake area had not. Both arms had supersaturated DO concentrations within the upper three meters as a result of algal photosynthesis (blooms). The oxycline was between 3 and 4 meters in the Camp Branch and between 2 and 3 meters in the upper Little Platte. The lower three meters of their respective water columns contained less than 1 mg/L DO. August stratification was equally severe in the down lake area with an 8 °C differential within the 15-meter water column. One third of the water column exhibited anaerobic conditions. However, within the arms, thermal stratification was less intense with only a 1 °C differential between surface and bottom waters. And the latter contained 1.6 to 2.2 mg/L DO. In September, the down lake area exhibited only a 2.4 °C differential between surface and bottom waters, indicating stratification was breaking down. With increased surface cooling and wind mixing, DO concentrations throughout the water column were slightly depressed, and the hypolimnion was relegated to the bottom 1 meter of the water column. In the Camp Branch arm, destratification was almost complete, i.e., essentially isothermal and well oxygenated (7.5 to 6.8 mg/L) throughout the water column. The upper Little Platte arm was still slightly stratified in September; however, it also was well oxygenated throughout. Historically, destratification first begins in the upper arms in late August or early September and progresses throughout the remainder of the lake concluding in October.

Mirroring 1997 and 1998 levels, turbidity in the surface waters of the down lake area during the 1999 monthly surveys was low with mean, minimum, and maximum of 7.7 NTU, 3.4 NTU, and 15 NTU, respectively. Means for each of the last three years have fallen below the 11 NTU mean for the period 1982-1996. Total suspended solids in 1999 were equally low with mean, minimum, and maximum concentrations of 7.2 mg/L, 5.6 mg/L, and 12 mg/L, respectively. Water clarity based on secchi depth and photic zone depth was relative good with no indication of light limitation, which would decrease algal productivity. The 1999 mean, minimum, and maximum secchi depths were 1.06 m, 0.61 m, and 1.37 m, respectively. The mean, minimum, and maximum photic zone depths for the down lake area were 2.57 m, 1.68 m, and 4.27 m, respectively. For comparison, the mean photic zone depths for 1997 and 1998 were 3.15 m and 2.90 m, respectively (Table 3).

Turbidity levels in the surface waters of the Camp Branch arm in 1999 were slightly greater than in the down lake area. The mean, minimum, and maximum for the arm were 11.8 NTU, 5.7 NTU, and 29 NTU, respectively. The arm had mean turbidity levels of 7.3 NTU, 10.5 NTU, and 15 NTU for 1998, 1997, and 1982-1996, respectively. Suspended solids mean, minimum, and maximum concentrations were 12.1 mg/L, 6.1 mg/L, and 20 mg/L, respectively, in 1999. Water clarity based on secchi depth and photic zone depth also indicated better than average conditions existed during 1999. The mean, minimum, and maximum secchi depths were 0.75 m, 0.46 m, and 1.01 m, respectively, and, in comparison, the photic zone depths for the arm were 1.74 m, 1.01 m, and 2.44 m, respectively. These levels suggested that algal photosynthesis would not be impaired.

As in 1998, the 1999 turbidity levels in the surface waters of the upper Little Platte arm were substantially lower than the mean for the period 1982-1996 (56 NTU). The mean, minimum, and maximum turbidities were 16 NTU, 8.3 NTU, and 44 NTU, respectively. Associated suspended solids exhibited mean, minimum, and maximum concentrations of 12 mg/L, 8 mg/L, and 16 mg/L, respectively. Although water clarity was somewhat limited in the spring, the summer levels were very satisfactory for algal photosynthesis. The mean, minimum, and maximum secchi depths were 0.69 m, 0.30 m, 0.91 m, respectively. Similarly, the photic zone depths were 1.58 m, 0.61 m, and 2.13 m, respectively.

The calculated total nitrogen (TN) concentrations in the lake have ranged from moderately enriched in the down lake area and Camp Branch arm to highly enriched or eutrophic in the upper Little Platte arm over the entire period of record. Long-term mean concentrations in the surface waters have ranged from 1 to 1.9 mg/L. The 1999 mean, minimum, and maximum TN concentrations were down lake area, 1.08 mg/L, 0.38 mg/L, and 1.59 mg/L; Camp Branch arm, 0.80 mg/L, 0.34 mg/L, and 1.65 mg/L; and Little Platte arm, 1.67 mg/L, 0.49 mg/L, and 4.20 mg/L, respectively. The maximum concentration in the upper Little Platte arm occurred in May and reflected the hypereutrophic input from storm runoff.

Following a long-term trend, seventy-eight percent of the 1999 total phosphorus (TP) concentrations equaled or exceeded the EPA generalized eutrophy criterion for lakes of 0.05 mg/L. Long-term mean concentrations have ranged from 0.07 mg/L (in the Camp Branch arm) to 0.16 mg/L (in the upper Little Platte arm). The 1999 mean, minimum, and maximum TP concentrations were down lake, 0.09 mg/L, 0.01 mg/L, and 0.35 mg/L; Camp Branch, 0.10 mg/L, 0.03 mg/L, and 0.38 mg/L; and Little Platte, 0.13 mg/L, 0.06 mg/L, and 0.46 mg/L, respectively. The 1999 data continue to show very enriched conditions in the upper Little Platte throughout the spring and summer.

Algal productivity reflected the high water clarity and highly enriched conditions in the lake in 1999. Mean chlorophyll concentrations in each arm of the lake exceeded the EPA generalized eutrophy criterion of 10 ug/L. And, as a result of the better water clarity in the upper arms, the 1999 mean concentrations were substantially higher than the long-term means for these areas. The mean, minimum, and maximum chlorophyll concentrations in 1999 were down lake, 5.0 ug/L, 2.1 ug/L, and 7.4 ug/L; Camp Branch, 12.9 ug/L, 1.7 ug/L, and 34.5 ug/L; and Little Platte, 16.3 ug/L, 7.2 ug/L, and 22.4 ug/L, respectively. While the lake mean chlorophyll

concentration for the growing season of 11.4 ug/L continues to be within a very eutrophic range, the hypereutrophic level in the upper arms is an indicator of excessive nutrient loading.

Most regulatory efforts in lake eutrophication management have been based on modeling studies, which attempted to correlate the relationship between algal productivity and nutrient concentrations. With the highly enriched conditions characteristic of most Midwest reservoirs, including Smithville Lake, water clarity has always been the dominant limiting factor. To demonstrate the relationships, chlorophyll concentrations were plotted against TN, TP, TSS, turbidity, secchi and photic zone depths for each lake station for the last three years (Figures 3-20). Chlorophyll concentrations fluctuate independently of either nutrient and are inversely related to turbidity and suspended solids. The direct relationship between eutrophic algal productivity and increased secchi and photic zone depths also shows the importance of water clarity given the continuous presence of high nutrient levels.

Four common herbicides (atrazine, alachlor, cyanazine, and metolachlor) were routinely detected in the surface and bottom waters of the lake during 1999. For comparative purposes, mean concentrations were computed for surface samples, since depth differences have not been found to be significant over the period of record (an exception was noted in June 1998 when bottom concentrations of atrazine in the Little Platte arm were four times greater than surface concentrations). The 1999 mean atrazine concentrations in the surface waters were as follows: down lake area, 1.42 ug/L; Camp Branch arm, 1.55 ug/L; and Little Platte arm, 3.66 ug/L. The down lake and Camp Branch mean concentrations have decreased each year of the watershed study from the 1997 means of 3.11 and 3.24 ug/L, respectively (Figures 21- 22). The Little Platte arm has rarely had mean annual atrazine concentrations below the MCL of 3 ug/L, because of the extremely high concentrations associated with spring storm runoff. In 1999 a concentration of 15.1 ug/L in May pushed the mean above the drinking water standard (Figure 23). The 1997 mean atrazine concentration of 9.52 ug/L was the result of high values throughout the year.

Mean alachlor concentrations in the surface waters of the down lake, Camp Branch, and Little Platte stations were well below the 2 ug/L MCL at 0.02 ug/L, 0.08 ug/L, and 0.08 ug/L, respectively. Mean cyanazine concentrations in the surface waters of the three areas were also below the MCLG of 1.00 ug/L at 0.12 ug/L, 0.11 ug/L; and 0.13 ug/L, respectively. Mean metolachlor concentrations in the surface waters were down lake, 0.94 ug/L; Camp Branch, 0.72 ug/L; and Little Platte, 1.84 ug/L. Highest concentrations were noted in May (3.18 ug/L) and June (2.65 ug/L). To date no MCL has been established for metolachlor.

Surface metal concentrations continued to be very low during 1999; however, dissolved manganese concentrations in the bottom waters during the months of intense stratification were substantially higher than the 50 MCL for drinking water supplies. Mean bottom concentrations were down lake, 1,236 ug/L, Camp Branch, 287 ug/L, and Little Platte, 91 ug/L. As noted in previous reports, the bottom sediments contribute large quantities of reduced manganese to the water column under anaerobic conditions.

c. **Outflow.** The outlet (SM-2) was well oxygenated during each of the 1999 surveys and fully met the state stream criterion of a minimum of 5 mg/L to protect warm-water fish species.

Water temperature, conductivity, pH, and orp or redox were within acceptable seasonal ranges. Turbidity and suspended solids were low with mean concentrations of 20 NTU and 21 mg/L, respectively. The nutrient levels remained enriched with mean TN and TP concentrations of 1.41 mg/L and 0.12 mg/L, respectively. Reflecting down lake conditions, atrazine concentrations in the outflow never exceeded the 3 ug/L MCL during 1999 survey periods. The 1999 mean concentration was 1.26 ug/L. There has been a decrease in atrazine concentrations in each of the last two years from the 1997 mean of 3.38 ug/l (Figure 24). Metolachlor, alachlor, and cyanazine were detected, but their concentrations were very low. Dissolved manganese concentrations exceeded the 50 ug/L MCL for drinking water supplies every month except April. The 1999 mean concentration was 588 ug/L.

4. Future conditions.

The water quality of Smithville Lake is moderately good and should remain so in the immediate future. Taste and odor problems in the drinking water supply can be expected to occur until nutrient levels from point and nonpoint sources are reduced. The large hog confinement operation in the Little Platte Basin has the potential to significantly impact nutrient loading and bacterial densities to the major arm of the reservoir, which is already hypereutrophic in the upper reaches. Atrazine and manganese will continue to adversely affect the drinking water supply. If land use practices within the watershed do not change, the loading of silt, nutrients, pesticides, and bacteria will adversely affect recreational, water supply, and sport fishery project purposes.

5. Recommendations.

Because of the concerns for nutrient and pesticide loading, the PM-PR-W recommends that monthly sampling during April-September continue in 2000. This work should include *in-situ* monitoring, bacterial analyses, field chemistry, and laboratory analyses for approximately 30 parameters. The District should continue to work for multi-agency cooperation on watershed pollution control and abatement.

6. Appendix.

Tables 1-3
Figures 1-24

Table 1. Smithville Lake 1999 Ambient Data

Station		Date	Depth	Time	Temp	D.O.	Spec. Cond.	pH	Orp.
		mm/dd/yy	m	hhmm	°C	mg/L	u ohms		mV
SM-2	Outlet	04/12/1999	0.1	1500	12.8	11.6			
SM-2		05/18/1999	0.1	1215	15.2	9.8	286	7.7	385
SM-2		06/22/1999	0.1	1215	18.9	8.3	282	7.4	291
SM-2		07/20/1999	0.1	1100	21.5	7.9	282	7.3	225
SM-2		08/26/1999	0.1	1430	25.3	7.7	258	8	326
SM-2		09/16/1999	0.1	1315	23.4	8.8	262	7.9	343
SM-3	Lake	04/12/1999	0.1	1030	12.7	10.3			
			1	1031	11.7	10.1			
			2	1032	11.6	9.9			
			3	1033	11.6	9.9			
			4	1034	11.6	9.8			
			5	1035	11.6	9.8			
			6	1036	11.6	9.8			
			7	1037	11.6	9.8			
			8	1038	11.5	9.8			
			9	1039	11.5	9.8			
			10	1040	11.5	9.8			
			11	1041	11.5	9.8			
			12	1042	11.5	9.8			
			13	1043	11.5	9.8			
			14	1044	11.5	9.8			
SM-3		05/18/1999	0.1	0900	16.4	9.1	284	7.9	374
			1	0901	16.3	9	284	7.9	373
			2	0902	16.2	8.9	284	7.9	375
			3	0903	16.2	8.8	284	7.9	375
			4	0904	16.2	8.8	284	7.9	376
			5	0905	16.2	8.8	285	7.9	377
			6	0906	16.2	8.7	284	7.9	377
			7	0907	16.1	8.7	284	7.9	377
			8	0908	16.1	8.6	285	7.9	378
			9	0909	15.9	8.1	285	7.7	380
			10	0910	15.2	7.6	287	7.6	383
			11	0911	14.7	7.1	287	7.6	386
			12	0912	14	6.5	287	7.5	388
			13	0913	13.8	6.1	287	7.4	391
			14	0914	13.7	5.9	287	7.4	392
			15	0915	13.7	5.7	287	7.4	392
			16	0916	13.5	4.8	288	7.4	394
SM-3		06/22/1999	0.1	0830	23.6	8.4	273	8.5	359
			1	0831	23.6	8.3	274	8.4	361
			2	0832	23.1	8	275	8.3	365
			3	0833	23	8	275	8.3	366
			4	0834	22.9	7.8	275	8.3	366
			5	0835	22.6	6.8	277	8.1	372
			6	0836	22.2	6.3	277	8	375
			7	0837	21.9	4.7	280	7.6	383
			8	0838	21.7	4.4	280	7.6	385
			9	0839	20.5	2	281	7.3	392
			10	0840	18.5	0.4	282	7.1	398
			11	0841	17.3	0.1	282	7.1	400
			12	0842	16.8	0.1	283	7.1	401
			13	0843	16.4	0.1	284	7.1	397
			14	0844	15.7	0.1	287	7.1	385
			15	0845	15.3	0.1	292	7.1	281

Station	Date mm/dd/yy	Depth m	Time hhmm	Temp °C	D.O. mg/L	Spec. Cond. u ohms	pH	Orp. mV
SM-3	07/20/1999	0.1	0830	27	8.1	262	8.5	309
		1	0831	26.9	7.9	263	8.4	310
		2	0832	26.8	7.5	263	8.3	310
		3	0833	26.8	7.3	264	8.3	310
		4	0834	26.7	6.1	264	8.1	314
		5	0835	26.4	4.8	265	7.8	321
		6	0836	26.2	3.8	265	7.7	325
		7	0837	25.5	2.2	268	7.4	332
		8	0838	25.1	1.4	268	7.3	334
		9	0839	24.9	0.7	269	7.3	336
		10	0840	23.4	0.2	272	7.2	337
		11	0841	22.3	0.1	275	7.2	332
		12	0842	20.6	0.1	284	7.2	323
		13	0843	19.6	0.1	290	7.1	305
		14	0844	18.7	0.1	297	7.1	289
		15	0845	18	0.1	307	7.1	226
SM-3	08/26/1999	0.1	1000	26.8	8.8	248	8.6	442
		1	1001	26.8	8.8	248	8.6	444
		2	1002	26.5	7.7	248	8.5	449
		3	1003	25.7	7.3	250	8.3	454
		4	1004	25.5	6.4	251	8.1	464
		5	1005	25.4	5.7	252	8	470
		6	1006	25.4	5.5	252	7.9	474
		7	1007	25.4	5.1	253	7.8	478
		8	1008	25.3	4.4	253	7.8	482
		9	1009	24.8	2.9	255	7.5	489
		10	1010	24.1	0.5	267	7.3	460
		11	1011	23.4	0.1	281	7.2	179
		12	1012	21.8	0.1	299	7.1	124
		13	1013	20.1	0.1	311	7.1	99
		14	1014	19.4	0.1	322	7	75
		15	1015	18.7	0.1	339	7	60
SM-3	09/16/1999	0.1	0900	22.9	5.9	249	7.6	404
		1	0901	22.8	5.9	252	7.6	404
		2	0902	22.8	5.8	252	7.6	404
		3	0903	22.8	5.7	252	7.6	405
		4	0904	22.8	5.7	252	7.6	405
		5	0905	22.8	5.6	252	7.6	406
		6	0906	22.8	5.1	252	7.6	408
		7	0907	22.8	5	253	7.5	409
		8	0908	22.8	5.5	253	7.6	408
		9	0909	22.8	5	253	7.5	410
		10	0910	22.7	5.9	252	7.7	409
		11	0911	22.7	6	252	7.7	409
		12	0912	22.7	5.4	253	7.6	410
		13	0913	22.6	4.6	254	7.5	413
		14	0914	20.5	0.2	318	7.2	85
SM-8	Lake	04/12/1999	0.1	1145	15.3	11.6		
			1	1146	13.3	11.3		
			2	1147	13.2	10.2		
			3	1148	13.1	9.9		
			4	1149	13	9.9		
			5	1150	12.9	9.8		
			6	1151	12.7	9.7		
			7	1152	12.5	9.7		

Station	Date	Depth	Time	Temp	D.O.	Spec. Cond.	pH	Orp.
	mm/dd/yy	m	hhmm	°C	mg/L	u ohms		mV
SM-8	05/18/1999	0.1	0945	17.7	8.4	268	7.8	384
		1	0946	17.6	8.3	269	7.7	384
		2	0947	17.5	8	269	7.7	386
		3	0948	17.4	8	269	7.7	386
		4	0949	17.4	7.9	270	7.7	387
		5	0950	17.4	7.9	270	7.7	387
		6	0951	17.3	7.6	273	7.6	388
		7	0952	16.7	6.2	281	7.5	394
		8	0953	14.9	4.7	280	7.4	397
SM-8	06/22/1999	0.1	0930	24.2	9.3	272	8.5	316
		1	0931	23.6	7.5	274	8.1	327
		2	0932	22.8	5.8	274	7.8	334
		3	0933	22.8	5.7	273	7.8	336
		4	0934	22.3	4.2	276	7.5	339
		5	0935	22.1	2.8	280	7.4	343
		6	0936	21.9	1.5	286	7.3	346
		7	0937	21.6	0.2	292	7.2	339
SM-8	07/20/1999	0.1	0900	29.7	13.2	186	9	238
		1	0901	29.3	13.8	186	8.9	245
		2	0902	28.6	10.8	208	8.5	259
		3	0903	27.6	7.1	223	7.9	275
		4	0904	27	3.5	244	7.6	285
		5	0905	26.5	0.5	262	7.3	291
		6	0906	26.1	0.1	270	7.2	234
		7	0907	25.5	0.1	282	7.1	141
SM-8	08/26/1999	0.1	1100	26.1	7.6	239	8.5	382
		1	1101	26	7.5	239	8.4	387
		2	1102	25.8	6	241	8.2	393
		3	1103	25.6	4	243	7.7	399
		4	1104	25.6	4	243	7.7	396
		5	1105	25.3	3.8	245	7.6	391
		6	1106	25.1	2.6	247	7.4	387
		6.5	1107	25.1	1.6	249	7.3	319
SM-8	09/16/1999	0.1	1000	22.1	7.5	245	8	340
		1	1001	22.1	7.4	247	8	345
		2	1002	22.1	7.2	247	7.9	348
		3	1003	22	7.1	247	7.9	350
		4	1004	22	6.6	248	7.8	353
		5	1005	21.7	5.3	251	7.6	356
		6	1006	21.5	6	250	7.8	356
		6.5	1007	21.5	6.8	249	7.9	285
SM-14	Lake	04/12/1999	0.1	1330	16.9	12.3		
			1	1331	13.8	10		
			2	1332	13.7	9.8		
			3	1333	13.6	9.8		
			4	1334	13.5	9.6		
			5	1335	13.5	9.4		
			6	1336	13.5	9.3		
			7	1337	13.4	9.3		
			8	1338	13.4	9.1		

Station	Date	Depth	Time	Temp	D.O.	Spec. Cond.	pH	Orp.
	mm/dd/yy	m	hhmm	°C	mg/L	u ohms		mV
SM-14	05/18/1999	0.1	1045	20.3	7.5	282	7.6	380
		1	1046	18	6.8	283	7.5	384
		2	1047	17.7	6.4	285	7.4	386
		3	1048	17.7	6.4	285	7.4	387
		4	1049	17.7	6.4	285	7.4	387
		5	1050	16.9	4.5	293	7.2	391
		6	1051	16.5	3.4	299	7.2	394
		7	1052	15.9	2.2	300	7.1	396
		8	1053	15.8	2	300	7.1	397
		9	1054	15.5	1.5	302	7.1	398
SM-14	06/22/1999	0.1	1030	24.3	9	279	8.5	316
		1	1031	24.3	8.9	279	8.5	320
		2	1032	24.2	8.3	280	8.4	324
		3	1033	22.9	3	294	7.4	344
		4	1034	22.3	2.6	299	7.3	346
		5	1035	22.1	1.8	296	7.3	346
		6	1036	21.9	1.1	298	7.2	347
		7	1037	21.7	0.8	299	7.2	345
		8	1038	21.7	0.5	301	7.2	343
		9	1039	21	0.1	311	7.2	236
SM-14	07/20/1999	0.1	1000	29.2	11.2	234	8.9	224
		1	1001	29.2	11.2	235	8.9	230
		2	1002	29.1	10.7	237	8.8	233
		3	1003	27.7	3.5	248	7.6	263
		4	1004	27.1	1.8	251	7.3	270
		5	1005	26.7	1	251	7.2	271
		6	1006	26.5	0.7	253	7.1	253
		7	1007	26.4	0.6	254	7.2	240
		8	1008	26.2	0.1	257	7.2	268
SM-14	08/26/1999	0.1	1300	26	7.3	238	8.3	409
		1	1301	25.9	7.1	238	8.3	411
		2	1302	25.8	5.9	240	8.1	418
		3	1303	25.5	4	242	7.6	426
		4	1304	25.4	3.8	243	7.5	427
		5	1305	25.3	3.5	244	7.5	427
		6	1306	25.2	3.1	245	7.4	427
		7	1307	25.2	2.4	247	7.3	425
		8	1308	25.1	2.2	248	7.3	420
SM-14	09/16/1999	0.1	1200	22.2	8.9	244	8.2	341
		1	1201	21.8	7	246	7.9	350
		2	1202	21.7	7.4	246	8	354
		3	1203	21.6	7.4	246	8	358
		4	1204	21.6	7.4	246	8	362
		5	1205	21.5	7.4	247	8	365
		6	1206	21.5	7.4	247	8	366
		7	1207	21.4	7.4	247	8	368
		8	1208	21.3	7.2	247	7.8	369
SM-16	Inflow	04/12/1999	0.1	1600	21.5	11		
SM-16		05/18/1999	0.1	1300	19.3	6.1	229	7.2
SM-16		06/22/1999	0.1	1300	26	14.9	431	8.4
SM-16		07/20/1999	0.1	1200	32.9	13.5	444	8.1
SM-16		08/26/1999	0.1	1600	26.4	5.8	435	7.3
SM-16		09/16/1999	0.1	1430	24.4	7.6	444	7.5

Table 2. Smithville Lake 1999 Water Quality Data

Station Det Limit	Depth	Date	Time	Atraz 0.02	Alachl 0.01	Metola 0.05	Cyan 0.01	NH3 0.01	NO3/NO2 40	TKN 1	TN	TP 0.05	TOrthP 0.05	D-Fe 0.05	D-Mn 0.1	Turb	TSS	Sec Dep	Phot Dep	Chl A
Rep Limit Units	m	mmddyy	hhmm	ug/L	ug/L	ug/L	ug/L	mg/L	mg/L	mg/L	Mg/L	mg/L	mg/L	ug/L	ug/L	NTU	mg/L	m	m	ug/L
SM-2	0.1	04/12/99	1500	0.9	<0.05	0.12	0.1	0.05	0.49	0.34	0.88	0.06	0.02	U	5	16	18			
SM-2	0.1	05/18/99	1215	1.76	0.06	0.4	0.14	0.2	0.69	0.61	1.5	0.36	0.04	U	62	23	20			
SM-2	0.1	06/22/99	1215	0.83	0.07	1.09	0.06	0.32	1.07	0.52	1.91	0.07	U	41	344	26	24			
SM-2	0.1	07/20/99	1100	1.23	0.06	1.43	0.08	0.4	0.5	0.82	1.72	0.1	0.04	U	1450	30	30			
SM-2	0.1	08/26/99	1430	1.34	<0.05	1.24	0.1	0.26	0.04	0.59	0.89	0.08	0.02	U	530	8.3	11			
SM-2	0.1	09/16/99	1315	1.49	0.06	1.35	0.1	0.41	0.01	1.14	1.56	0.08	0.01	U	1140	17	21			
SM-3	0.1	04/12/99	1030	0.91	<0.05	0.13	0.14	U	0.54	0.32	0.86	0.05	0.02	U	1	12	12	0.61	1.68	
SM-3	0.1	05/18/99	0900	1.95	<0.05	0.42	0.12	0.18	0.68	0.73	1.59	0.35	0.03	U	3	15	8.3	0.76	1.83	2.1
SM-3	0.1	06/22/99	0830	1.1	<0.05	1.36	0.11	0.12	0.96	0.44	1.52	0.05	U	U	1	5.3	5.6	1.31	4.27	4.5
SM-3	0.1	07/20/99	0830	1.26	0.07	1.05	0.1	0.3	0.71	0.44	1.45	0.05	0.02	U	16.5	3.4	5.6	1.37	3.05	6.3
SM-3	0.1	08/26/99	1000	1.51	<0.05	1.25	0.11	U	0.04	0.34	0.38	0.02	0.01	U	U	4.5	5.8	1.22	2.44	7.4
SM-3	0.1	09/16/99	0900	1.77	0.08	1.42	0.11	0.08	U	0.61	0.69	0.01	U	U	U	6	5.6	1.1	2.13	4.5
SM-3	14	04/12/99	1044	0.89	<0.05	0.13	0.12	0.03	0.53	0.4	0.96	0.07	0.02	U	1	20	23			
SM-3	16	05/18/99	0916	1.36	<0.05	0.26	0.11	0.32	0.69	0.64	1.65	0.37	0.04	U	155	31	21			
SM-3	15	06/22/99	0845	0.67	<0.05	0.99	0.07	0.23	0.99	0.52	1.74	0.09	0.01	U	672	39	29			
SM-3	15	07/20/99	0845	1.23	0.07	1.48	0.08	0.55	0.29	0.97	1.81	0.09	0.03	U	2010	31	30			
SM-3	15	08/26/99	1015	2.06	0.07	1.33	0.1	1.39	0.05	1.68	3.12	0.14	0.07	69	4460	21	19			
SM-3	14	09/16/99	0914	1.82	0.07	1.38	0.05	0.12	U	0.64	0.76	0.03	U	U	116	9	9.6			
SM-8	0.1	04/12/99	1145	0.84	<0.05	0.15	0.09	U	0.1	0.42	0.52	0.05	0.01	U	3	13	18	0.61	1.22	
SM-8	0.1	05/18/99	0945	2.04	0.06	0.79	0.13	0.3	0.66	0.69	1.65	0.38	0.05	U	8	29	20	0.46	1.01	7.4
SM-8	0.1	06/22/99	0930	1.92	<0.05	0.81	0.15	0.14	0.44	0.5	1.08	0.05	0.01	U	4	5.7	6.1	1.01	2.44	11.2
SM-8	0.1	07/20/99	0900	1.77	0.07	0.76	0.1	U		0.58	0.58	0.07	0.02	U	11	8	11	0.79	1.83	34.5
SM-8	0.1	08/26/99	1100	1.11	0.26	0.81	0.09	U	0.04	0.3	0.34	0.03	0.01	U	U	7.4	7.8	0.88	1.98	9.5
SM-8	0.1	09/16/99	1000	1.61	0.08	1.01	0.12	U	U	0.6	0.6	0.04	U	U	U	8	9.6	0.76	1.98	1.7
SM-8	7	04/12/99	1152	0.8	<0.05	0.13	0.1	U	0.59	0.11	0.7	0.11	0.02	U	7	37	56			
SM-8	8	05/18/99	0953	2.3	0.06	0.82	0.14	0.41	0.68	0.89	1.98	0.4	0.06	U	139	67	50			
SM-8	7	06/22/99	0937	2	0.07	0.87	0.15	0.18	0.58	0.61	1.37	0.07	0.02	U	383	26	27			
SM-8	7	07/20/99	0907	1.5	0.06	0.72	0.1	0.39		1.15	1.54	0.15	0.03	U	1150	44	50			
SM-8	6.5	08/26/99	1107	1.59	<0.05	0.83	0.12	0.1	0.05	0.35	0.5	0.05	U	U	43.6	21	19			
SM-8	6.5	09/16/99	1007	1.56	<0.05	0.91	0.07	U	U	0.67	0.67	0.06	U	U	U	21	27			
SM-14	0.1	04/12/99	1330	0.4	<0.05	0.08	0.05	0.04	0.43	0.45	0.92	0.07	0.03	U	2	9	12	0.76	1.71	
SM-14	0.1	05/18/99	1045	15.1	0.18	3.18	0.27	0.44	2.71	1.05	4.2	0.46	0.1	160	20	44	16	0.3	0.61	7.2
SM-14	0.1	06/22/99	1030	1.38	0.12	2.65	0.12	0.12	1.54	0.65	2.31	0.06	0.02	U	518	11	8	0.73	1.55	17.6

Station Det Limit Rep Limit Units	Depth m	Date mmddyy	Time hhmm	Atraz ug/L	Alachl ug/L	Metola ug/L	Cyan ug/L	NH3 mg/L	NO3/NO2 mg/L	TKN mg/L	TN Mg/L	TP mg/L	TorthP mg/L	D-Fe ug/L	D-Mn ug/L	Turb NTU	TSS mg/L	Sec Dep	Phot Dep	Chl A ug/L
SM-14	0.1	07/20/99	1000	1.79	0.11	1.95	0.1	U	0.57	0.84	1.41	0.08	0.02	U	5	8.3	11	0.91	2.13	17.7
SM-14	0.1	08/26/99	1300	1.54	<0.05	1.82	0.11	U	0.07	0.42	0.49	0.07	0.02	U	U	10	11	0.7	1.58	22.4
SM-14	0.1	09/16/99	1200	1.72	0.09	1.35	0.11	U	U	0.69	0.69	0.06	U	U	U	11	13	0.73	1.89	16.7
SM-14	8	04/12/99	1338	0.39	<0.05	0.1	<0.04	0.18	0.46	0.69	1.33	0.09	0.04	U	8	26	34			
SM-14	9	05/18/99	1054	18.1	0.18	3.07	0.31	0.79	2.43	1.58	4.8	0.6	0.09	U	473	181	160			
SM-14	9	06/22/99	1039	1.38	0.18	3.8	0.12	0.25	2.23	0.84	3.32	0.13	0.02	U	529	40	33			
SM-14	8	07/20/99	1008	2.13	0.13	2.94	0.12	0.28	0.92	0.87	2.07	0.18	0.06	U	207	30	28			
SM-14	8	08/26/99	1308	1.77	0.07	0.98	0.1	0.15	0.03	0.53	0.71	0.08	0.03	U	15	26	32			
SM-14	8	09/16/99	1208	1.65	<0.05	1.28	0.1	U	U	0.76	0.76	0.05	0.01	U	U	30	40			
SM-16	0.1	04/12/99	1600	10.6	0.11	2.94	0.24	0.37	3.18	1.82	5.37	0.27	0.13	U	297	39	42			
SM-16	0.1	05/18/99	1300	28.6	0.34	7	0.38	0.43	3.15	2.26	5.84	0.8	0.18	66	21	225	247			
SM-16	0.1	06/22/99	1300	4.83	0.21	4.19	0.27	0.17	0.98	1.83	2.98	0.17	0.02	U	181	18	23			
SM-16	0.1	07/20/99	1200	1.56	0.1	1.09	0.08	0.03		1.22	1.25	0.2	0.03	U	26	17	26			
SM-16	0.1	08/26/99	1600	1.26	<0.05	0.53	0.09	0.03	U	0.5	0.53	0.09	0.01	U	10	16	20			
SM-16	0.1	09/16/99	1430	1.03	<0.05	0.39	0.08	0.07	0.05	0.97	1.09	0.1	0.03	U	114	17	21			

Table 3. Smithville Lake Water Quality Data, 1997-1999

Stat	Depth M	Date mmddyy	Time hhmm	Atraz ug/L	Alach ug/L	Meto ug/L	Cyan ug/L	Chl ug/L	NH3 mg/L	NO3/NO2 mg/L	TKN mg/L	TN mg/L	TP mg/L	TorP mg/L	Turb NTU	TSS mg/L	Secc Dep m	Phot Dep m	D-Mn ug/L
SM-2	0.1	05/21/97	1330	3.58	0.24	1.05	0.69		0.21	0.7	0.9	1.81	0.11	0.04	15	16			
	0.1	06/17/97	1400	2.9	0.09	.05K	0.55		0.03	0.65	0.8	1.48	0.4	0.05	12	10			
	0.1	07/15/97	1535	3.86	0.14	0.8	0.63		<0.02	0.16	0.7	0.86	0.16	0.04	7.8	10			
	0.1	08/13/97	1356	3.18	0.07	0.63	0.55		0.11	0.03	1.1	1.24	0.45	0.03	6	8			
SM-2	0.1	04/23/98	1230	2.92	0.07	0.26	0.51		0.04	0.31	0.4	0.75	0.04	0.03	8	7			
	0.1	05/21/98	1230	2.26	0.07	0.28	0.47		0.11	0.22	1	1.33	0.09	0.01	6	7			
	0.1	06/16/98	1245	2.1	0.07	0.3	0.41		0.12	0.34	0.8	1.26	0.05	0.04	3.7	3			
	0.1	07/22/98	1230	2.33	0.06	0.66	0.43		0.05	0.03	0.4	0.48	0.09	0.03	5.5	6		16.7	
	0.1	08/19/98	1220	2.12	0.06	0.6	0.39		0.07	0.03	0.5	0.6	0.13	0.02	7.2	6		119	
	0.1	09/09/98	1330	2.45	0.11	0.61	0.39		0.08	0.09	0.8	0.97	0.03	0.03	7	6		37	
SM-2	0.1	04/12/99	1500	0.9	<0.05	0.12	0.1		0.05	0.49	0.34	0.88	0.06	0.02	16	18		5	
	0.1	05/18/99	1215	1.76	0.06	0.4	0.14		0.2	0.69	0.61	1.5	0.36	0.04	23	20		62	
	0.1	06/22/99	1215	0.83	0.07	1.09	0.06		0.32	1.07	0.52	1.91	0.07	U	26	24		344	
	0.1	07/20/99	1100	1.23	0.06	1.43	0.08		0.4	0.5	0.82	1.72	0.1	0.04	30	30		1450	
	0.1	08/26/99	1430	1.34	<0.05	1.24	0.1		0.26	0.04	0.59	0.89	0.08	0.02	8.3	11		530	
	0.1	09/16/99	1315	1.49	0.06	1.35	0.1		0.41	0.01	1.14	1.56	0.08	0.01	17	21		1140	
SM-3	0.1	04/22/97	1030	2.75	0.22	0.6	0.7	16.3	0.44	0.21	0.7	1.35	0.02	0.01	8.4	9	0.91		
	0.1	05/20/97	1005	2.66	0.11	0.94	0.58	11.6	0.18	0.46	0.8	1.44	0.08	0.02	11	10	0.82	2	
	0.1	06/17/97	1159	3.2	0.12	0.93	0.59	9.6	0.02	0.37	0.7	1.09	0.39	0.03	3.2	3	1.98	4.1	
	0.1	07/15/97	1054	3.72	0.12	0.99	0.66	5.4	0.05	0.14	0.7	0.89	0.25	0.02	3.3	4	1.68	3.7	
	0.1	08/13/97	0926	3.22	0.1	0.68	0.55	11.5	<0.02	0.01	1	1.01	0.3	0.02	5	6	1.37	2.8	
SM-3	0.1	04/23/98	0900	3.05	0.09	0.26	0.5	8.3	0.03	0.36	0.2	0.59	0.06	0.03	8	7	0.91	2.5	
	0.1	05/21/98	0900	2.49	0.09	0.31	0.47	11.5	0.08	0.22	0.9	1.2	0.11	0.01	6.6	5	1.31	3.1	
	0.1	06/16/98	0915	2.38	0.13	0.36	0.44	13.5	0.18	0.28	0.8	1.26	0.22	0.03	5	3	1.83	3.8	
	0.1	07/22/98	0930	2.44	0.07	0.64	0.49	12.3	<0.02	0.02	0.4	0.42	0.09	0.02	5.4	5	1.37	2.7	
	0.1	08/19/98	0830	2.21	0.06	0.62	0.42	13.6	<0.02	0.03	0.5	0.53	0.12	0.02	4.4	4	1.28	3.4	
	0.1	09/09/98	0900	2.37	0.08	0.55	0.33	21.2	0.05	0.05	0.5	0.6	0.07	0.02	7	6	0.91	2.1	
SM-3	0.1	04/12/99	1030	0.91	<0.05	0.13	0.14		U	0.54	0.32	0.86	0.05	0.02	12	12	0.61	1.68	
	0.1	05/18/99	0900	1.95	<0.05	0.42	0.12	2.1	0.18	0.68	0.73	1.59	0.35	0.03	15	8.3	0.76	1.83	
	0.1	06/22/99	0830	1.1	<0.05	1.36	0.11	4.5	0.12	0.96	0.44	1.52	0.05	U	5.3	5.6	1.31	4.27	
	0.1	07/20/99	0830	1.26	0.07	1.05	0.1	6.3	0.3	0.71	0.44	1.45	0.05	0.02	3.4	5.6	1.37	3.05	
	0.1	08/26/99	1000	1.51	<0.05	1.25	0.11	7.4	U	0.04	0.34	0.38	0.02	0.01	4.5	5.8	1.22	2.44	
	0.1	09/16/99	0900	1.77	0.08	1.42	0.11	4.5	0.08	U	0.61	0.69	0.01	U	6	5.6	1.1	2.13	
SM-3	16	04/22/97	1046	2.86	0.19	0.6	0.87		0.11	0.3	1.1	1.51	0.02	0.01	12	7			
	16	05/20/97	1021	2.84	0.13	0.91	0.59		0.24	0.39	0.7	1.33	0.04	0.03	42	45			
	15	06/17/97	1214	2.77	0.1	0.75	0.56		0.02	0.66	0.8	1.48	0.11	0.04	15	12			
	15	07/15/97	1109	2.99	0.12	0.91	0.62		0.34	0.05	1	1.39	0.32	0.03	23	20			
	15	08/13/97	0941	3.29	0.16	1	0.58		0.94	0.01	2	2.95	0.52	0.07	25	25			
SM-3	11	04/23/98	0911	2.81	0.18	0.38	0.48		0.05	0.32	0.2	0.57	0.03	0.03	16	9			
	16.5	05/21/98	0917	2.74	0.11	0.36	0.52		0.31	0.04	1	1.35	0.08	0.02	23	24			

Stat	Depth M	Date mmddyy	Time hhmm	Atraz ug/L	Alach ug/L	Meto ug/L	Cyan ug/L	Chl ug/L	NH3 mg/L	NO3/NO2 mg/L	TKN mg/L	TN mg/L	TP mg/L	TorP mg/L	Turb NTU	TSS mg/L	Secc Dep m	Phot Dep m	D-Mn ug/L
SM-3	14	06/16/98	0929	2.60	0.12	0.33	0.48		0.04	0.43	0.60	1.07	0.04	0.03	29	46			
	15	07/22/98	0945	2.22	0.09	0.42	0.44		0.77	0.03	0.80	1.60	0.14	0.08	20	19		2350	
	15	08/19/98	0845	2.03	0.05	0.44	0.38		1.4	0.03	1.8	3.23	0.38	0.13	20	15		3580	
	15	09/09/98	0915	2.3	0.07	0.42	0.38		1.09	0.12	1.5	2.71	0.1	0.04	18	11		3480	
SM-3	14	04/12/99	1044	0.89	<0.05	0.13	0.12		0.03	0.53	0.4	0.96	0.07	0.02	20	23		1	
	16	05/18/99	0916	1.36	<0.05	0.26	0.11		0.32	0.69	0.64	1.65	0.37	0.04	31	21		155	
	15	06/22/99	0845	0.67	<0.05	0.99	0.07		0.23	0.99	0.52	1.74	0.09	0.01	39	29		672	
	15	07/20/99	0845	1.23	0.07	1.48	0.08		0.55	0.29	0.97	1.81	0.09	0.03	31	30		2010	
	15	08/26/99	1015	2.06	0.07	1.33	0.1		1.39	0.05	1.68	3.12	0.14	0.07	21	19		4460	
	14	09/16/99	0914	1.82	0.07	1.38	0.05		0.12	U	0.64	0.76	0.03	U	9	9.6		116	
SM-8	0.1	04/22/97	1200	1.95	0.26	0.4	0.48	26.8	0.44	0.41	1.1	1.95	0.05	0.01	24	16	0.46		
	0.1	05/20/97	1120	4.55	0.11	2.37	0.45	17.9	0.03	0.1	0.8	0.93	0.03	0.01	9	9	0.91	2.1	
	0.1	06/17/97	1053	3.04	0.09	0.73	0.53	11.2	<0.02	0.11	0.8	0.91	0.4	0.03	6.1	7	0.94	2.4	
	0.1	07/15/97	1210	3.61	0.17	0.78	0.57	2.4	<0.02	0.06	0.6	0.66	0.1	0.02	5.3	7	1.13	2.7	
	0.1	08/13/97	1042	3.04	0.1	0.45	0.53	17.5	0.02	0.01	1.2	1.23	0.38	0.02	8	11	0.76	1.8	
SM-8	0.1	04/23/98	1000	1.98	0.06	0.12	0.35	13.7	0.05	0.37	0.4	0.82	0.03	0.03	9	11	0.76	1.6	
	0.1	05/21/98	0950	2.49	0.06	0.53	0.54	11.3	0.07	0.14	0.8	1.01	0.03	0.01	5.6	7	1.22	2.8	
	0.1	06/16/98	1000	2.34	0.07	0.38	0.46	20.4	0.15	0.08	0.7	0.93	0.11	0.03	7	7	1.19	2.4	
	0.1	07/22/98	1045	2.14	0.07	0.31	0.39	13.8	<0.02	0.03	0.5	0.53	0.13	0.03	7.3	8	1.01	2.4	
	0.1	08/19/98	0945	2.05	<0.05	0.34	0.37	18.2	0.04	0.02	0.6	0.66	0.13	0.03	6.6	5	0.98	2.7	
	0.1	09/09/98	1015	2.22	0.09	0.33	0.37	15.8	0.1	0.05	0.6	0.75	0.09	0.03	8.5	8	0.85	1.7	
SM-8	0.1	04/12/99	1145	0.84	<0.05	0.15	0.09		U	0.1	0.42	0.52	0.05	0.01	13	18	0.61	1.22	
	0.1	05/18/99	0945	2.04	0.06	0.79	0.13	7.4	0.3	0.66	0.69	1.65	0.38	0.05	29	20	0.46	1.01	
	0.1	06/22/99	0930	1.92	<0.05	0.81	0.15	11.2	0.14	0.44	0.5	1.08	0.05	0.01	5.7	6.1	1.01	2.44	
	0.1	07/20/99	0900	1.77	0.07	0.76	0.1	34.5	U		0.58	0.58	0.07	0.02	8	11	0.79	1.83	
	0.1	08/26/99	1100	1.11	0.26	0.81	0.09	9.5	U	0.04	0.3	0.34	0.03	0.01	7.4	7.8	0.88	1.98	
	0.1	09/16/99	1000	1.61	0.08	1.01	0.12	1.7	U	U	0.6	0.6	0.04	U	8	9.6	0.76	1.98	
SM-8	7	04/22/97	1207	2.3	0.13	0.42	0.69		0.1	0.34	0.7	1.14	0.03	0.01	25	12			
	7	05/20/97	1127	2.78	0.12	0.89	0.47		0.25	0.21	0.9	1.36	0.03	0.01	22	17			
	7.5	06/17/97	1101	3.35	0.15	0.92	0.56		0.46	0.14	1.6	2.2	0.42	0.04	34	36			
	7	07/15/97	1217	3.27	0.11	0.78	0.56		0.08	0.05	0.7	0.83	0.08	0.02	15	16			
	7	08/13/97	1049	3.24	0.13	0.63	0.57		0.06	0.01	1.2	1.27	0.25	0.02	13	19			
SM-8	7	04/23/98	1007	2.53	0.13	0.19	0.42		0.15	0.3	0.8	1.25	0.11	0.03	80	116			
	8	05/21/98	0958	2.39	<0.05	0.53	0.51		0.48	0.15	1.2	1.83	0.18	0.02	23	29			
	8	06/16/98	1008	2.18	0.09	0.49	0.44		0.09	0.13	0.9	1.12	0.08	0.03	55	80			
	7.5	07/22/98	1053	2.08	<0.05	0.33	0.39		0.87	0.04	1.2	2.11	0.12	0.09	65	72		1730	
	7	08/19/98	0952	1.9	<0.05	0.29	0.33		0.23	0.03	0.6	0.86	0.16	0.03	28	29			
	7.5	09/09/98	1023	2.12	0.08	0.3	0.36		0.09	0.07	0.6	0.76	0.1	0.03	19	21		2	
SM-8	7	04/12/99	1152	0.8	<0.05	0.13	0.1		U	0.59	0.11	0.7	0.11	0.02	37	56		7	
	8	05/18/99	0953	2.3	0.06	0.82	0.14		0.41	0.68	0.89	1.98	0.4	0.06	67	50		139	
	7	06/22/99	0937	2	0.07	0.87	0.15		0.18	0.58	0.61	1.37	0.07	0.02	26	27		383	

Stat	Depth M	Date mmddyy	Time hhmm	Atraz ug/L	Alach ug/L	Meto ug/L	Cyan ug/L	Chl ug/L	NH3 mg/L	NO3/NO2 mg/L	TKN mg/L	TN mg/L	TP mg/L	TorP mg/L	Turb NTU	TSS mg/L	Secc Dep m	Phot Dep m	D-Mn ug/L
SM-8	7	07/20/99	0907	1.5	0.06	0.72	0.1		0.39		1.15	1.54	0.15	0.03	44	50		1150	
	6.5	08/26/99	1107	1.59	<0.05	0.83	0.12		0.1	0.05	0.35	0.5	0.05	U	21	19		43.6	
	6.5	09/16/99	1007	1.56	<0.05	0.91	0.07		U	U	0.67	0.67	0.06	U	21	27		U	
SM-14	0.1	04/22/97	1345	10.66	0.24	6.26	1.85	19.9	0.44	2.41	2.1	4.95	0.25	0.12	90	52	0.15		
	0.1	05/20/97	0905	22.9	<0.10	3.5	<0.10	12.2	0.1	1.29	1.1	2.49	0.08	0.05	33	17	0.4	0.9	
	0.1	06/17/97	0930	5.68	0.14	1.53	<0.10	30.8	<0.02	0.1	0.8	0.9	0.51	0.03	9.2	10	0.85	1.9	
	0.1	07/15/97	1406	4.8	0.12	.10K	0.69	2.5	<0.02	0.03	0.8	0.83	0.09	0.02	6.7	9	0.91	2	
	0.1	08/13/97	1224	3.54	<0.05	0.82	3	30.4	0.03	0.01	1.2	1.24	0.33	0.03	13	17	0.61	1.4	
SM-14	0.1	04/23/98	1100	0.86	0.1	0.14	0.13	19.5	0.06	1.4	0.8	2.26	0.11	0.05	33	27	0.37	0.9	
	0.1	05/21/98	1100	2.21	0.11	0.36	0.45	40.3	0.03	0.1	1.2	1.33	0.29	0.02	9	12	0.82	1.7	
	0.1	06/16/98	1100	3.65	0.14	2.48	0.84	24.9	0.5	0.2	1	1.7	0.23	0.03	12	14	0.73	1.4	
	0.1	07/22/98	1145	3.03	0.13	2.07	0.55	20.4	<0.02	0.03	0.6	0.63	0.12	0.03	12	12	0.76	1.5	
	0.1	08/19/98	1045	2.41	0.08	0.96	0.38	23.3	0.08	0.03	0.5	0.61	0.1	0.03	7.9	8	0.91	2.1	
	0.1	09/09/98	1130	2.3	0.12	0.73	0.33	27.6	0.05	0.09	0.9	1.04	0.04	0.04	16	15	0.61	1.3	
SM-14	0.1	04/12/99	1330	0.4	<0.05	0.08	0.05		0.04	0.43	0.45	0.92	0.07	0.03	9	12	0.76	1.71	
	0.1	05/18/99	1045	15.1	0.18	3.18	0.27	7.2	0.44	2.71	1.05	4.2	0.46	0.1	44	16	0.3	0.61	
	0.1	06/22/99	1030	1.38	0.12	2.65	0.12	17.6	0.12	1.54	0.65	2.31	0.06	0.02	11	8	0.73	1.55	
	0.1	07/20/99	1000	1.79	0.11	1.95	0.1	17.7	U	0.57	0.84	1.41	0.08	0.02	8.3	11	0.91	2.13	
	0.1	08/26/99	1300	1.54	<0.05	1.82	0.11	22.4	U	0.07	0.42	0.49	0.07	0.02	10	11	0.7	1.59	
	0.1	09/16/99	1200	1.72	0.09	1.35	0.11	16.7	U	U	0.69	0.69	0.06	U	11	13	0.73	1.89	
SM-14	9	04/22/97	1354	7.06	0.26	4.24	1.1		0.35	1.52	1.2	3.07	0.15	0.06	54	22			
	9	05/20/97	0915	5.56	0.23	2.71	0.94		0.39	0.96	1.5	2.85	0.17	0.09	140	136			
	8	06/17/97	0936	6.72	0.17	1.75	0.86		0.39	0.28	1.3	1.97	0.51	0.06	39	41			
	8.5	07/15/97	1415	4.38	0.24	1.14	0.71		0.75	0.04	1.8	2.59	0.25	0.15	56	60			
	7.5	08/13/97	1232	3.5	0.09	0.61	0.63		0.11	0.01	1.3	1.42	0.36	0.03	26	36			
SM-14	9	04/23/98	1109	1.77	0.07	0.14	0.27		0.26	0.91	0.6	1.77	0.09	0.05	38	32			
	9	05/21/98	1109	1.66	<0.05	0.28	0.32		0.92	1.07	1.6	3.59	0.16	0.05	33	40			
	9	06/16/98	1109	12.8	0.74	11.7	1.19		0.31	2.07	2	4.38	0.34	0.06	250	134			
	8	07/22/98	1153	3.64	0.36	3.37	0.61		0.92	0.04	1.4	2.36	0.28	0.19	68	76		1520	
	8.5	08/19/98	1054	2.01	0.12	1.24	0.28		0.14	0.03	1	1.17	0.34	0.16	70	70		1130	
	9	09/09/98	1139	1.15	0.07	0.5	0.14		1.02	0.16	1.9	3.08	0.47	0.31	70	58		1180	
SM-14	8	04/12/99	1338	0.39	<0.05	0.1	<0.04		0.18	0.46	0.69	1.33	0.09	0.04	26	34		8	
	9	05/18/99	1054	18.1	0.18	3.07	0.31		0.79	2.43	1.58	4.8	0.6	0.09	181	160		473	
	9	06/22/99	1039	1.38	0.18	3.8	0.12		0.25	2.23	0.84	3.32	0.13	0.02	40	33		529	
	8	07/20/99	1008	2.13	0.13	2.94	0.12		0.28	0.92	0.87	2.07	0.18	0.06	30	28		207	
	8	08/26/99	1308	1.77	0.07	0.98	0.1		0.15	0.03	0.53	0.71	0.08	0.03	26	32		15	
	8	09/16/99	1208	1.65	<0.05	1.28	0.1		U	U	0.76	0.76	0.05	0.01	30	40		U	

Stat	Depth M	Date mmddyy	Time hhmm	Atraz ug/L	Alach ug/L	Meto ug/L	Cyan ug/L	Chl ug/L	NH3 mg/L	NO3/NO2 mg/L	TKN mg/L	TN mg/L	TP mg/L	TorP mg/L	Turb NTU	TSS mg/L	Secc Dep m	Phot Dep m	D-Mn ug/L
SM-16	0.1	05/21/97	1245	13.84	0.24	3.05	0.95		0.17	0.44	1.7	2.31	0.12	0.02	21	38			
	0.1	06/17/97	1455	8.54	1.81	17.35	2.51		0.38	3.48	2.7	6.56	0.5	0.17	140	102			
	0.1	07/15/97	1637	18.5	0.41	4.31	1.68		0.02	0.4	1.4	1.82	0.14	0.02	18	36			
	0.1	08/13/97	1453	9.6	0.2	2.51	0.86		0.2	0.08	1.8	2.08	0.44	0.04	18	27			
SM-16	0.1	04/23/98	1330	0.28	0.06	0.07	0.06		0.05	0.97	1.4	2.42	0.2	0.05	26	10			
	0.1	05/21/98	1330	24.5	0.29	8.1	5.8		0.12	0.16	1.5	1.78	0.12	0.07	21	33			
	0.1	06/16/98	1345	11	0.57	11.5	0.75		0.1	2.62	2.5	5.22	0.55	0.18	500	330			
	0.1	07/22/98	1430	2.12	0.29	1.66	0.35		0.02	0.05	1.1	1.17	0.09	0.06	16	31	10.2		
	0.1	08/19/98	1315	0.6	0.06	0.51	0.08		0.06	0.16	1.7	1.92	0.66	0.2	35	30	4.2		
	0.1	09/09/98	1445	0.79	0.08	1.22	0.09		0.11	0.6	1.3	2.01	0.48	0.26	38	25	126		
SM-16	0.1	04/12/99	1600	10.6	0.11	2.94	0.24		0.37	3.18	1.82	5.37	0.27	0.13	39	42	297		
	0.1	05/18/99	1300	28.6	0.34	7	0.38		0.43	3.15	2.26	5.84	0.8	0.18	225	247	21		
	0.1	06/22/99	1300	4.83	0.21	4.19	0.27		0.17	0.98	1.83	2.98	0.17	0.02	18	23	181		
	0.1	07/20/99	1200	1.56	0.1	1.09	0.08		0.03		1.22	1.25	0.2	0.03	17	26	26		
	0.1	08/26/99	1600	1.26	<0.05	0.53	0.09		0.03	U	0.5	0.53	0.09	0.01	16	20	10		
	0.1	09/16/99	1430	1.03	<0.05	0.39	0.08		0.07	0.05	0.97	1.09	0.1	0.03	17	21	114		

Figure 1. Inflow (Sm-16) Total Phosphorus Concentrations, 1997-1999

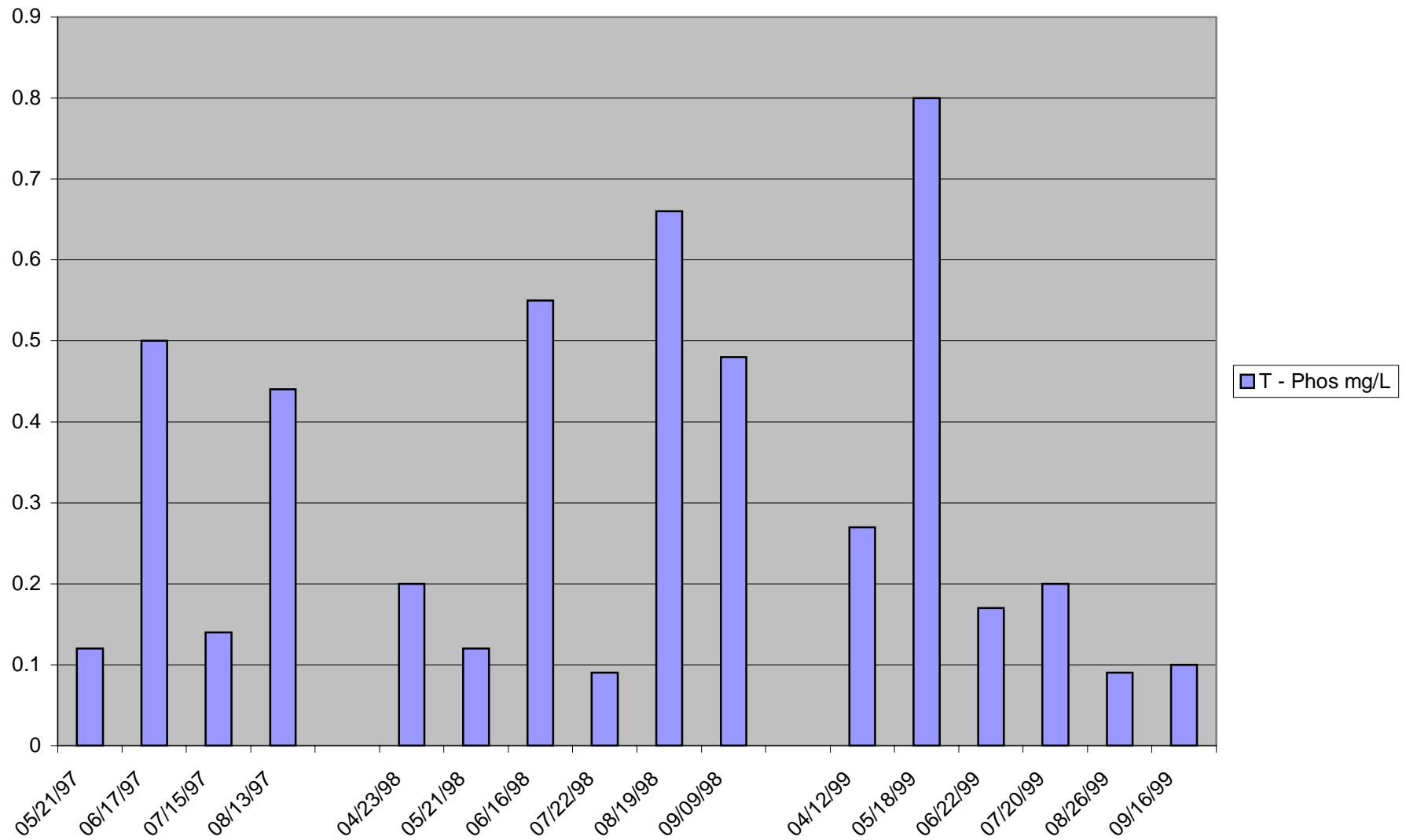


Figure 2. Inflow (Sm-16) Atrazine Concentrations, 1997-1999

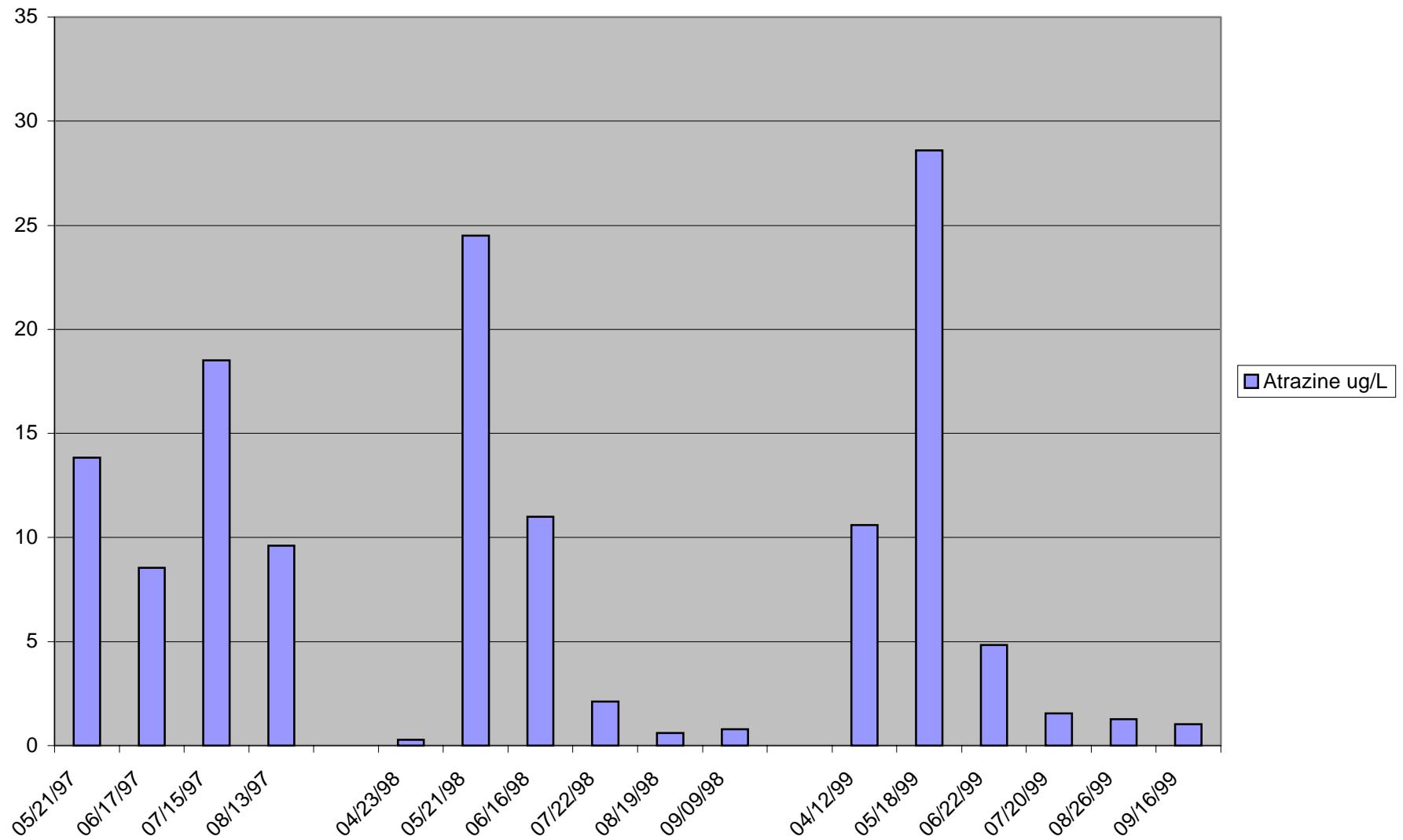


Figure 3. Down Lake (Sm-3) Chlorophyll and Total Nitrogen Concentrations, 1997-1999

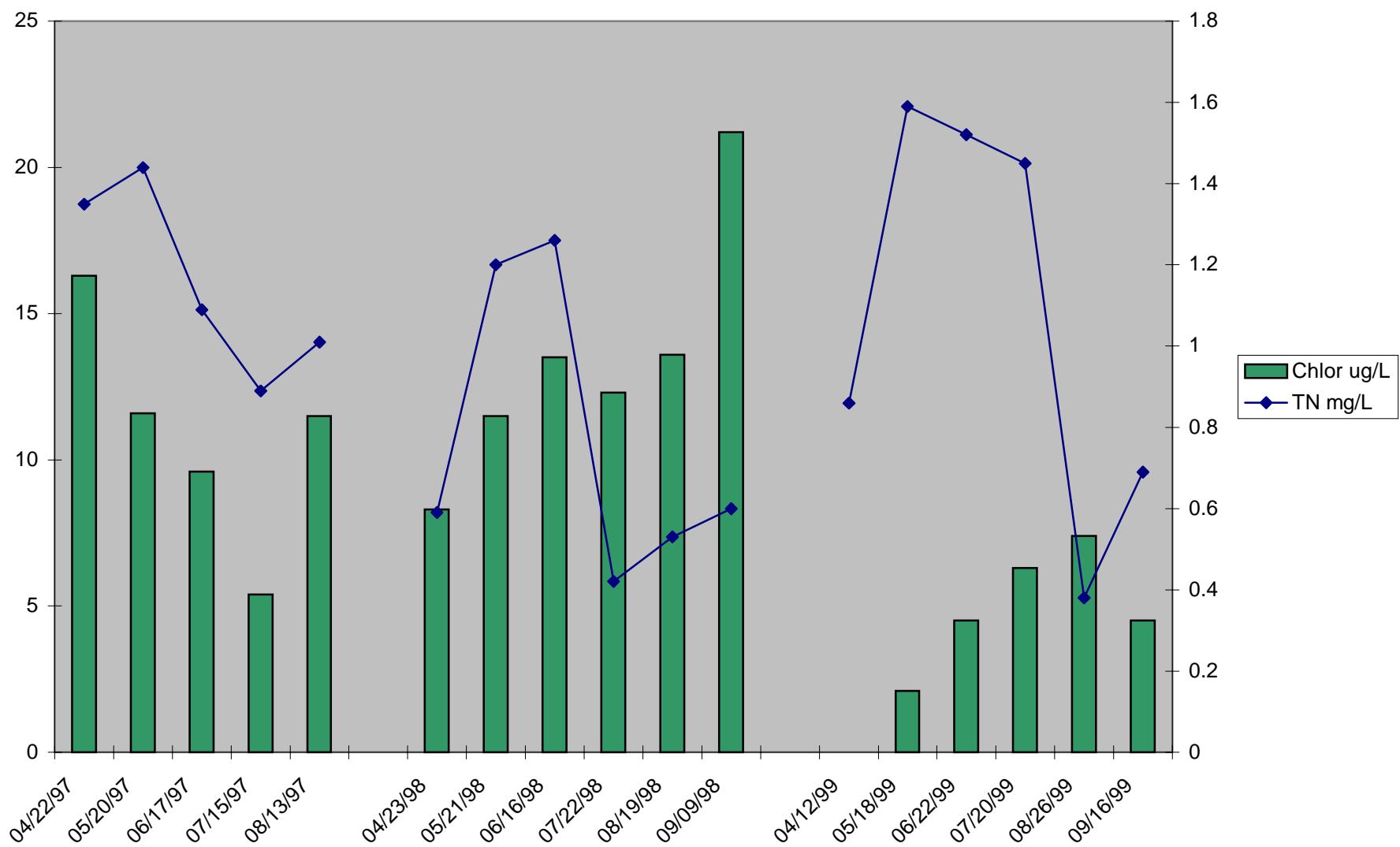


Figure 4. Camp Branch Arm (Sm-8) Chlorophyll and Total Nitrogen Concentrations, 1997-1999

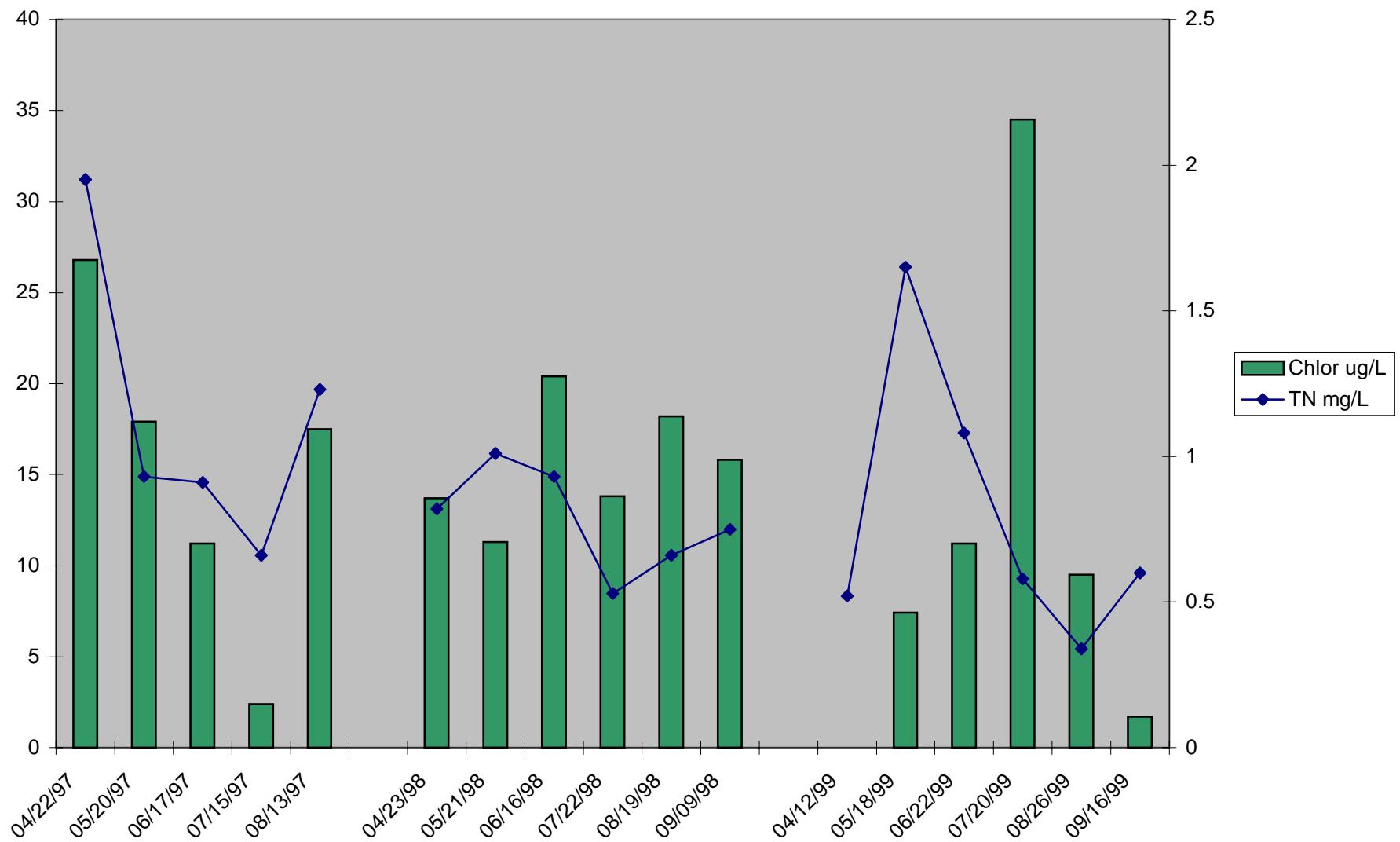


Figure 5. Little Platte Arm (Sm-14) Chlorophyll and Total Nitrogen Concentrations, 1997-1999

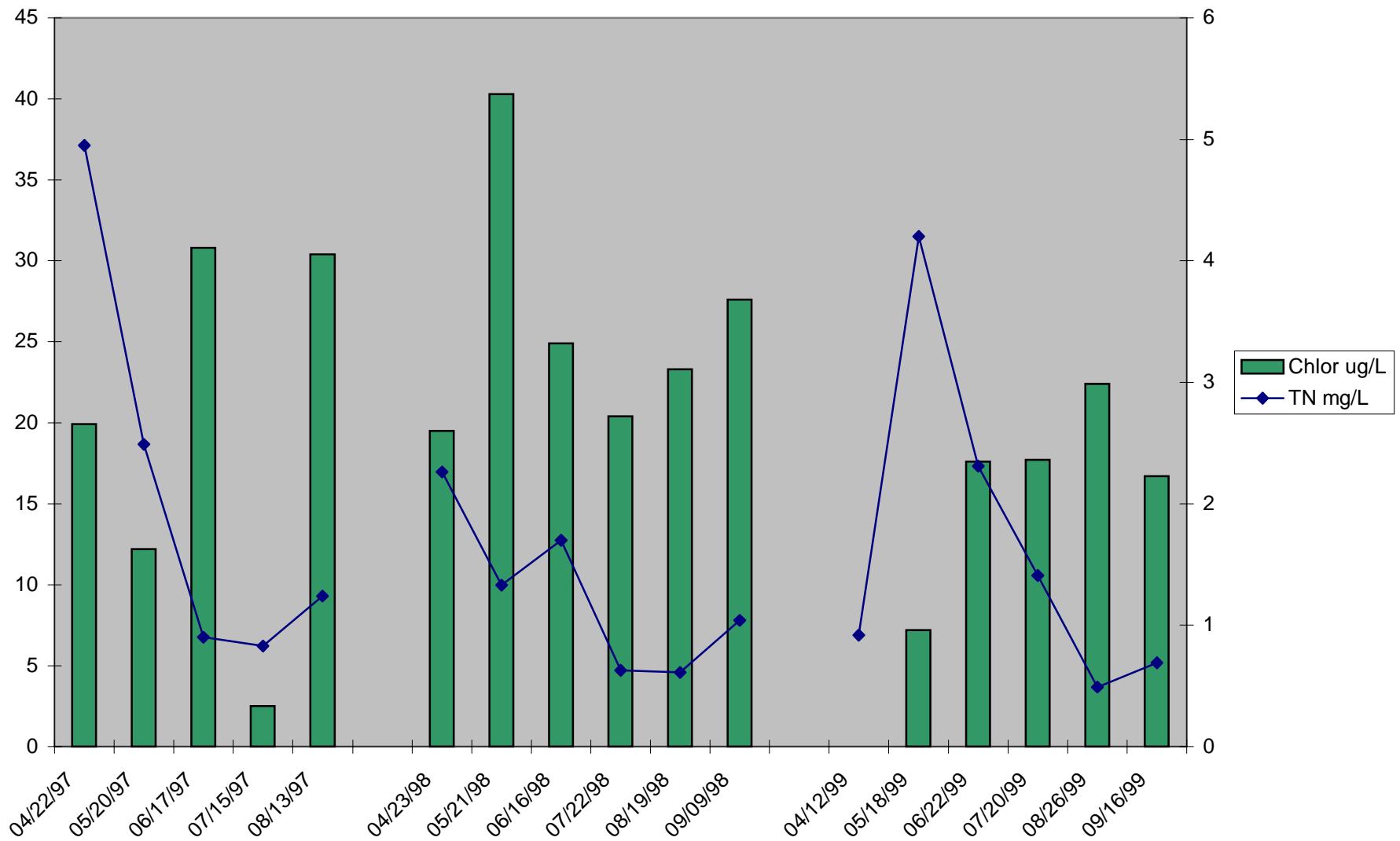


Figure 6. Down Lake (Sm-3) Chlorophyll and Total Phosphorus Concentrations, 1997-1999

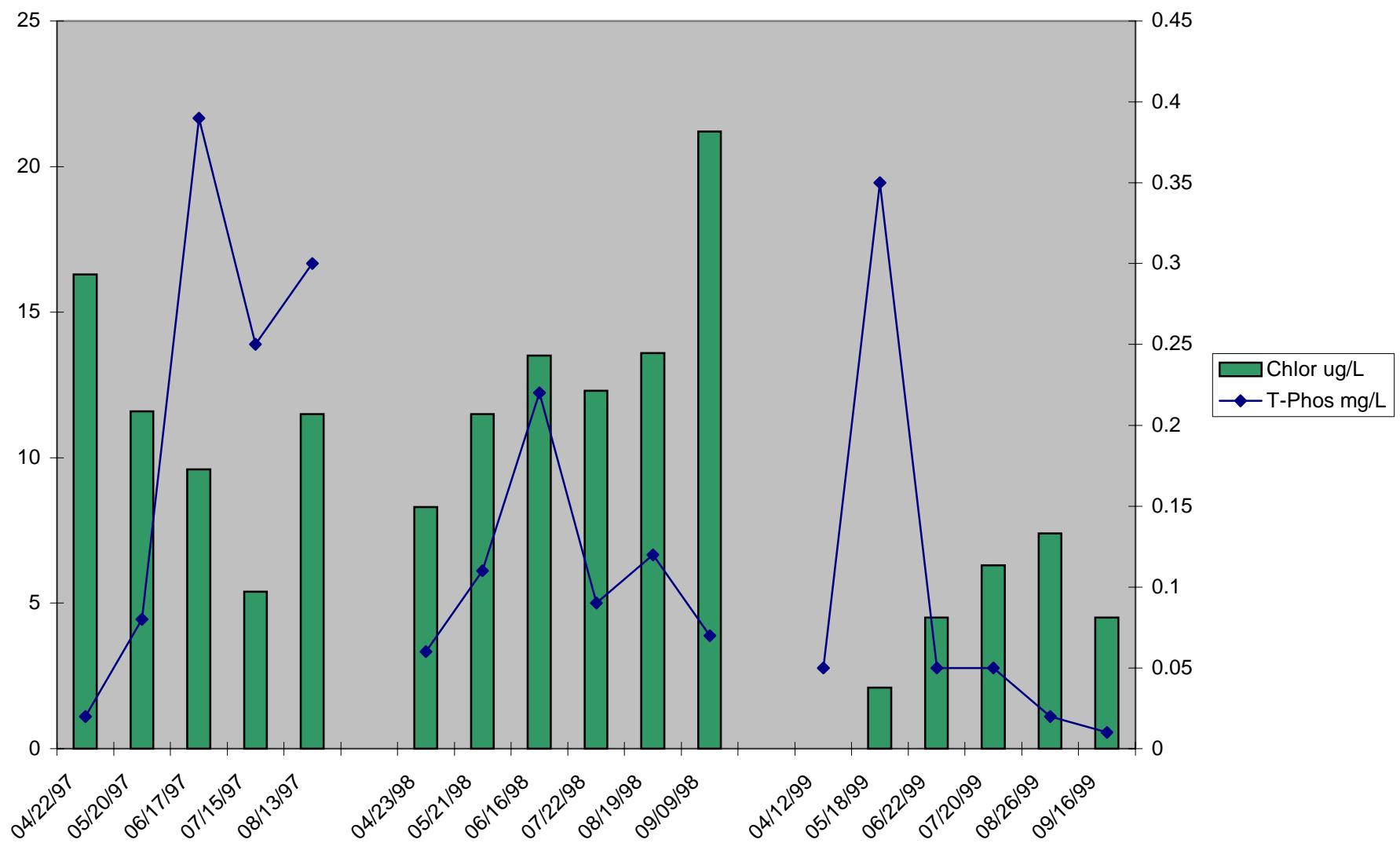


Figure 7. Camp Branch Arm (Sm-8) Chlorophyll and Total Phosphorus Concentrations, 1997-1999

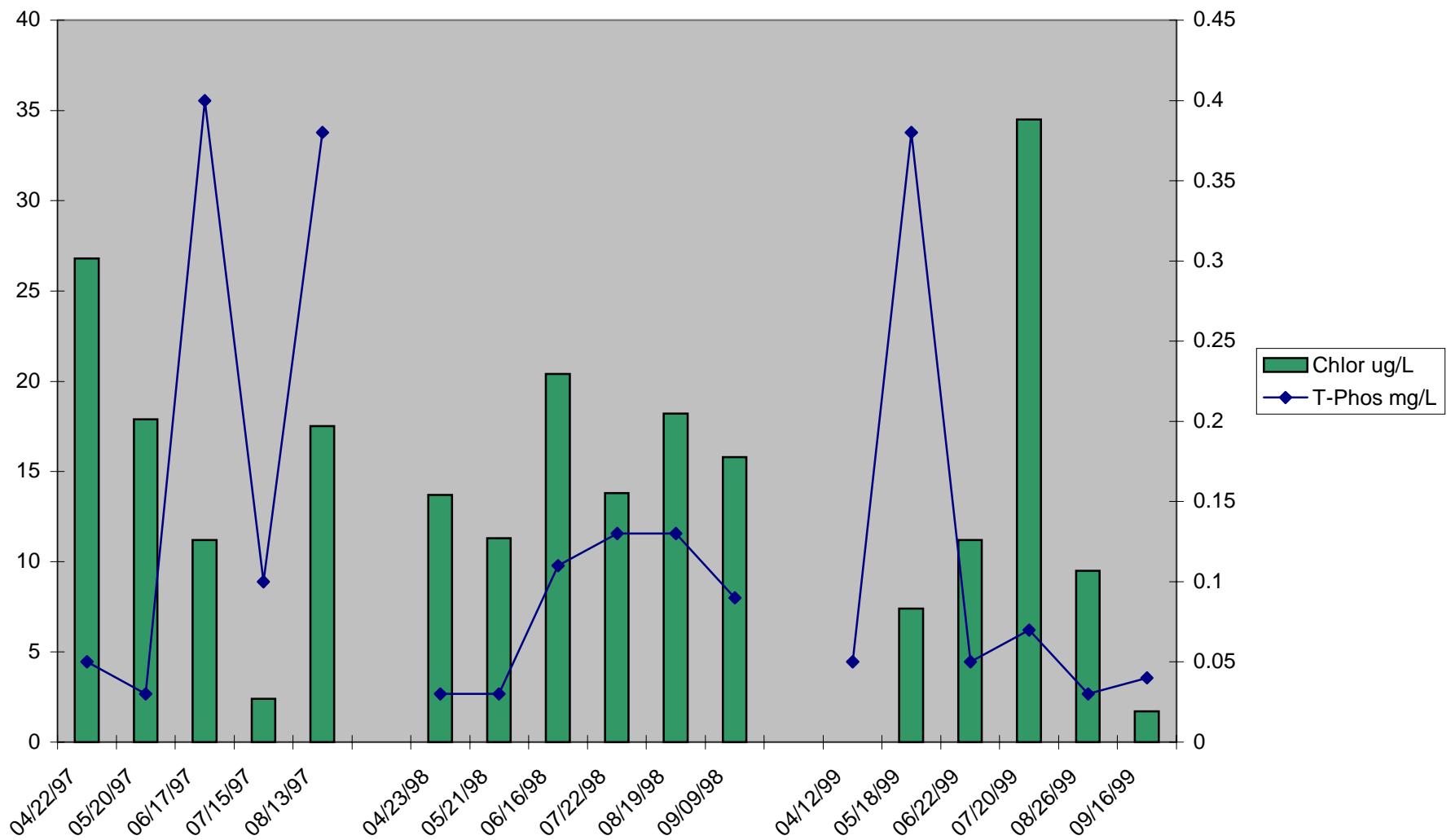


Figure 8. Little Platte Arm (Sm-14) Chlorophyll and Total Phosphorus Concentrations, 1997-1999

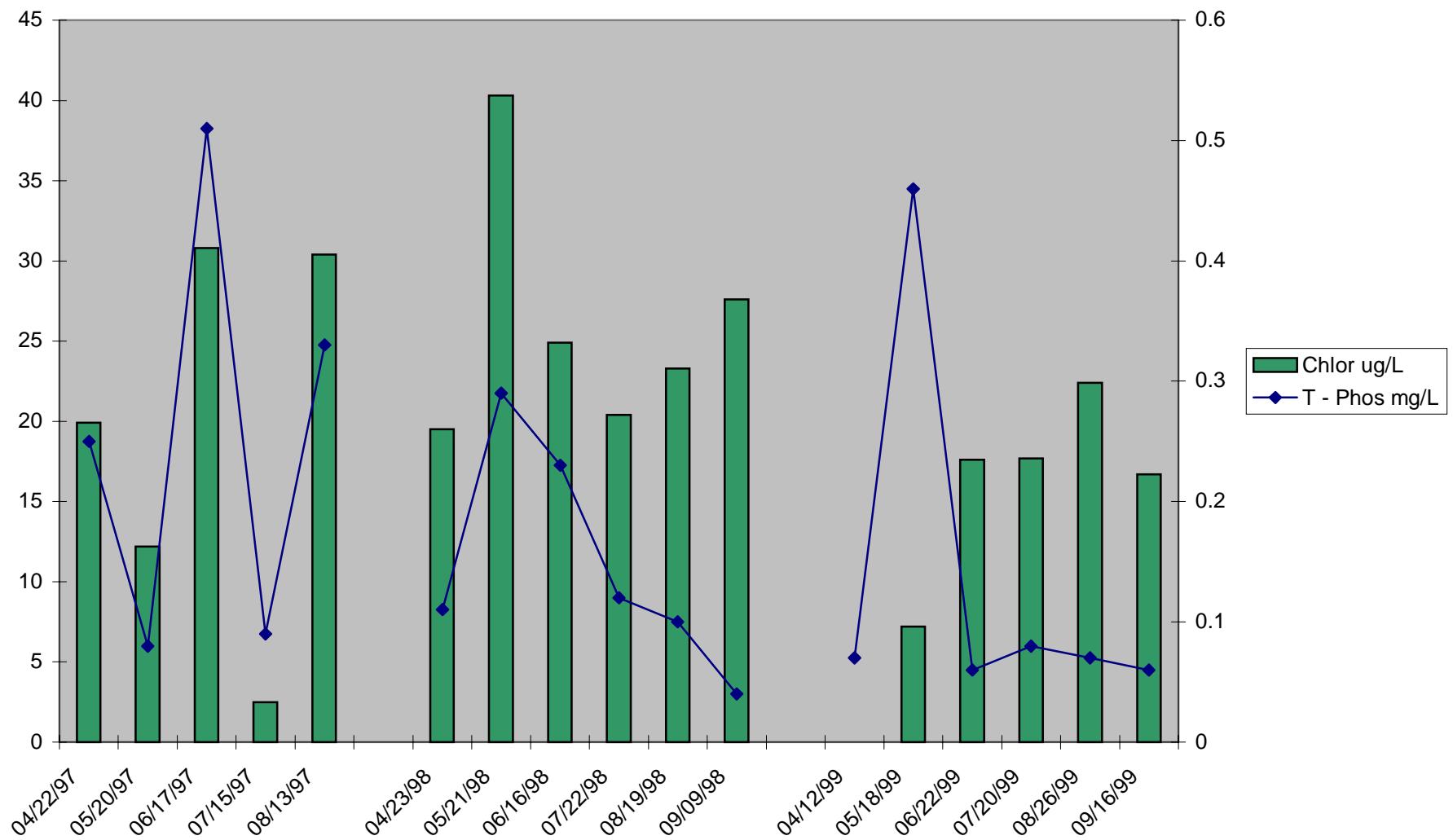


Figure 9. Down Lake (Sm-3) Chlorophyll and Total Suspended Solids Concentrations, 1997-1999

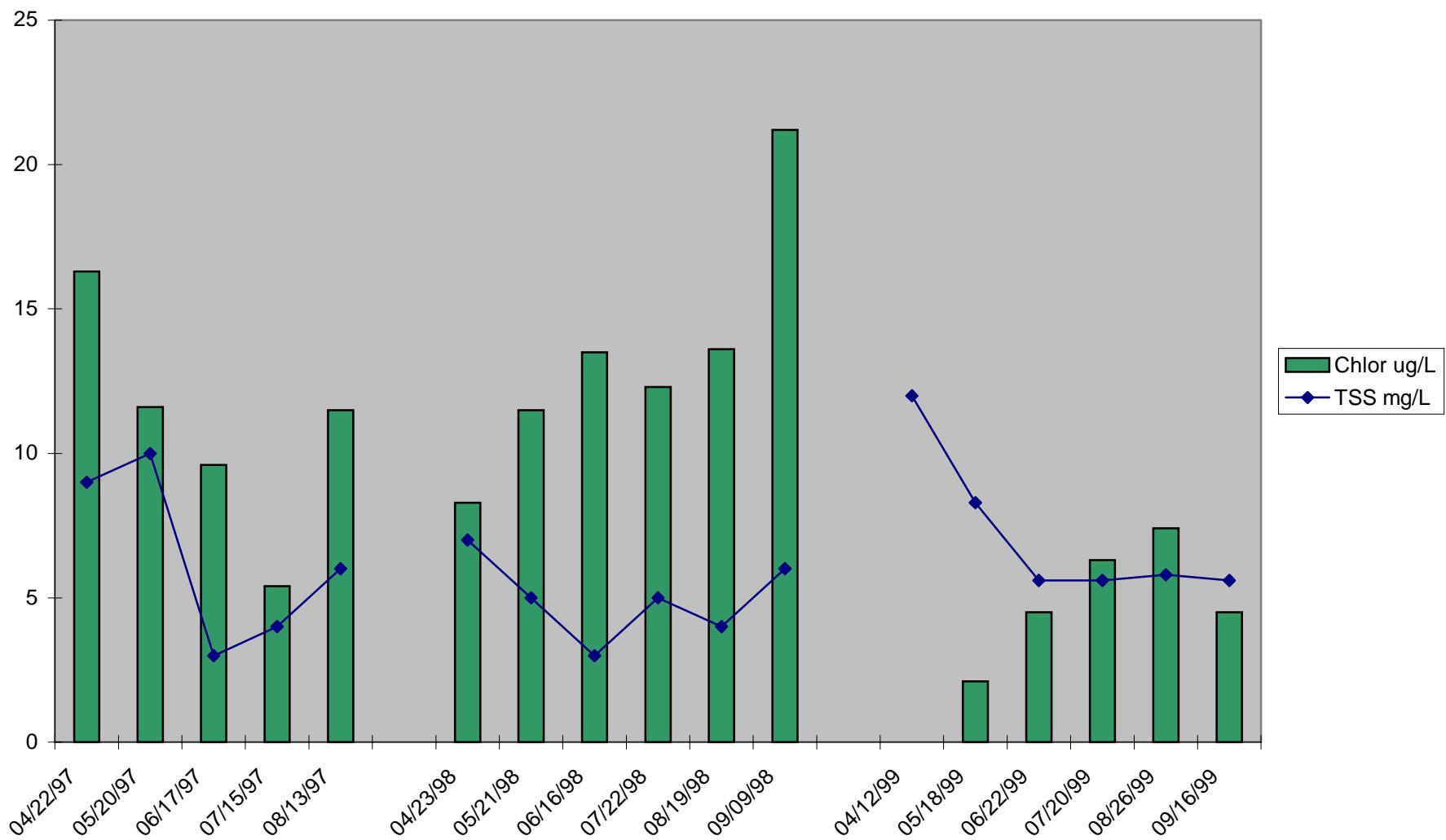


Figure 10. Camp Branch Arm (Sm-8) Chlorophyll and Total Suspended Solids Concentrations, 1997-1999

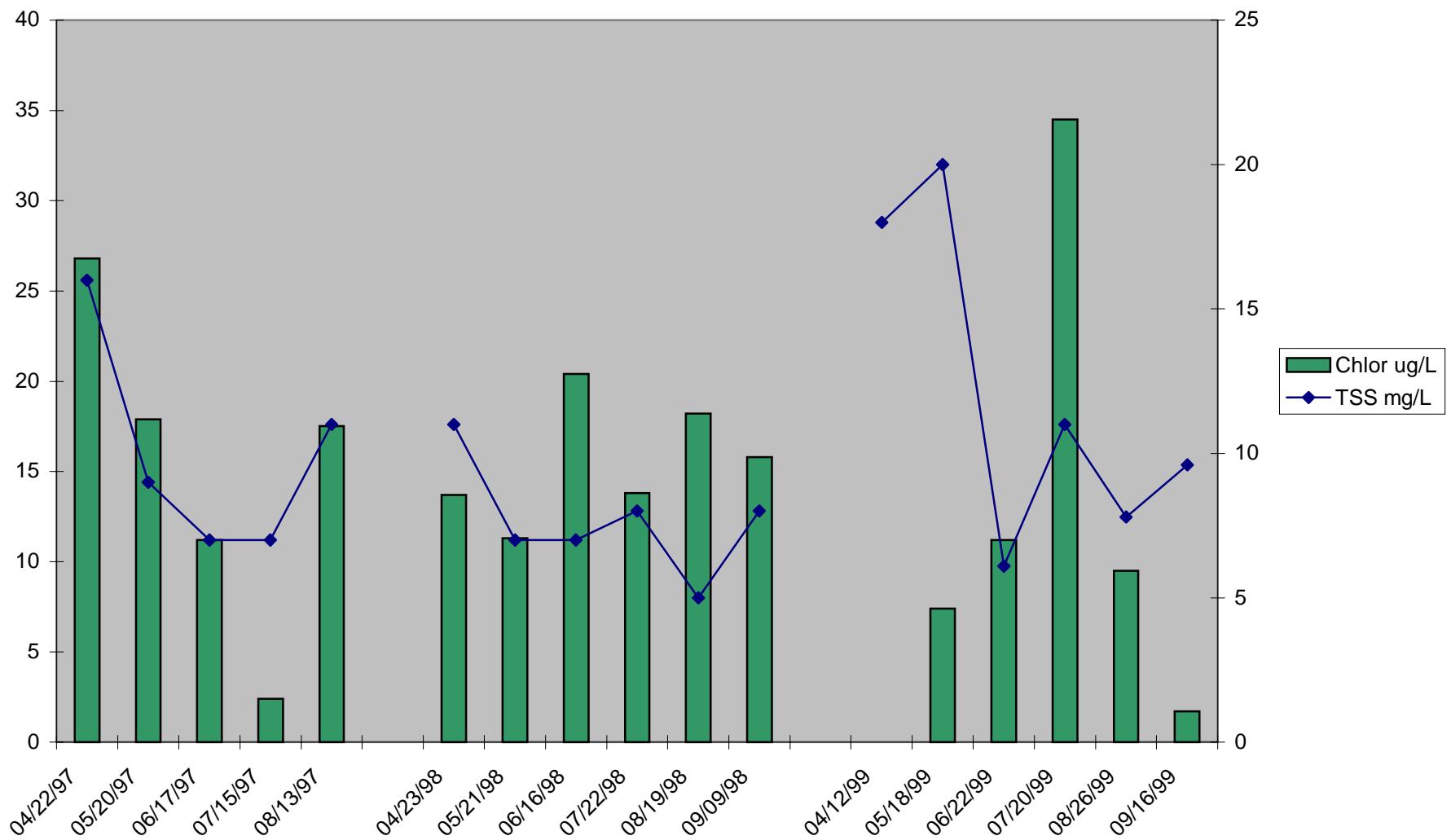


Figure 11. Little Platte Arm (Sm-14) Chlorophyll and Total Suspended Solids Concentrations, 1997-1999

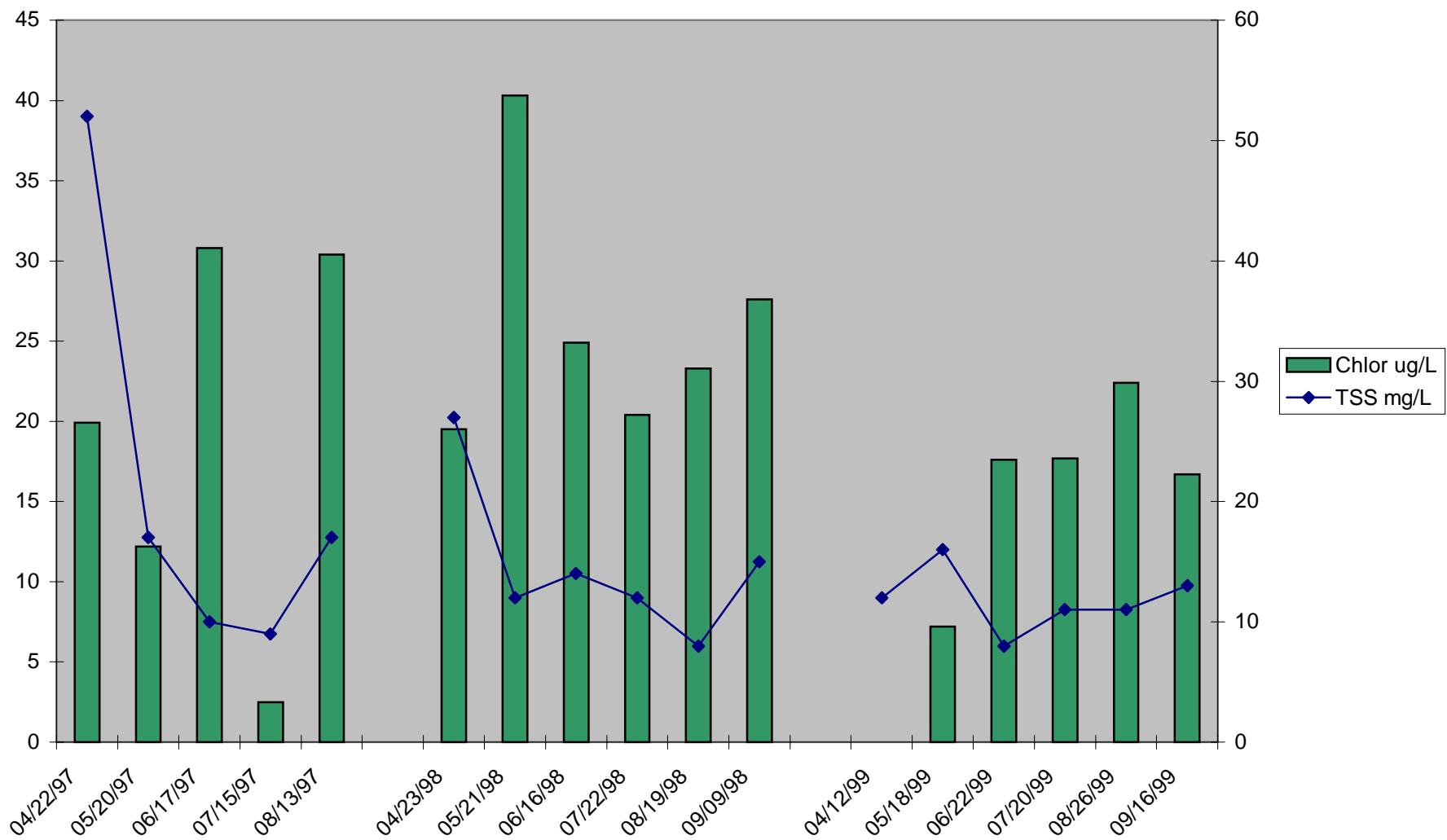


Figure 12. Down Lake (Sm-3) Chlorophyll and Turbidity Concentrations, 1997-1999

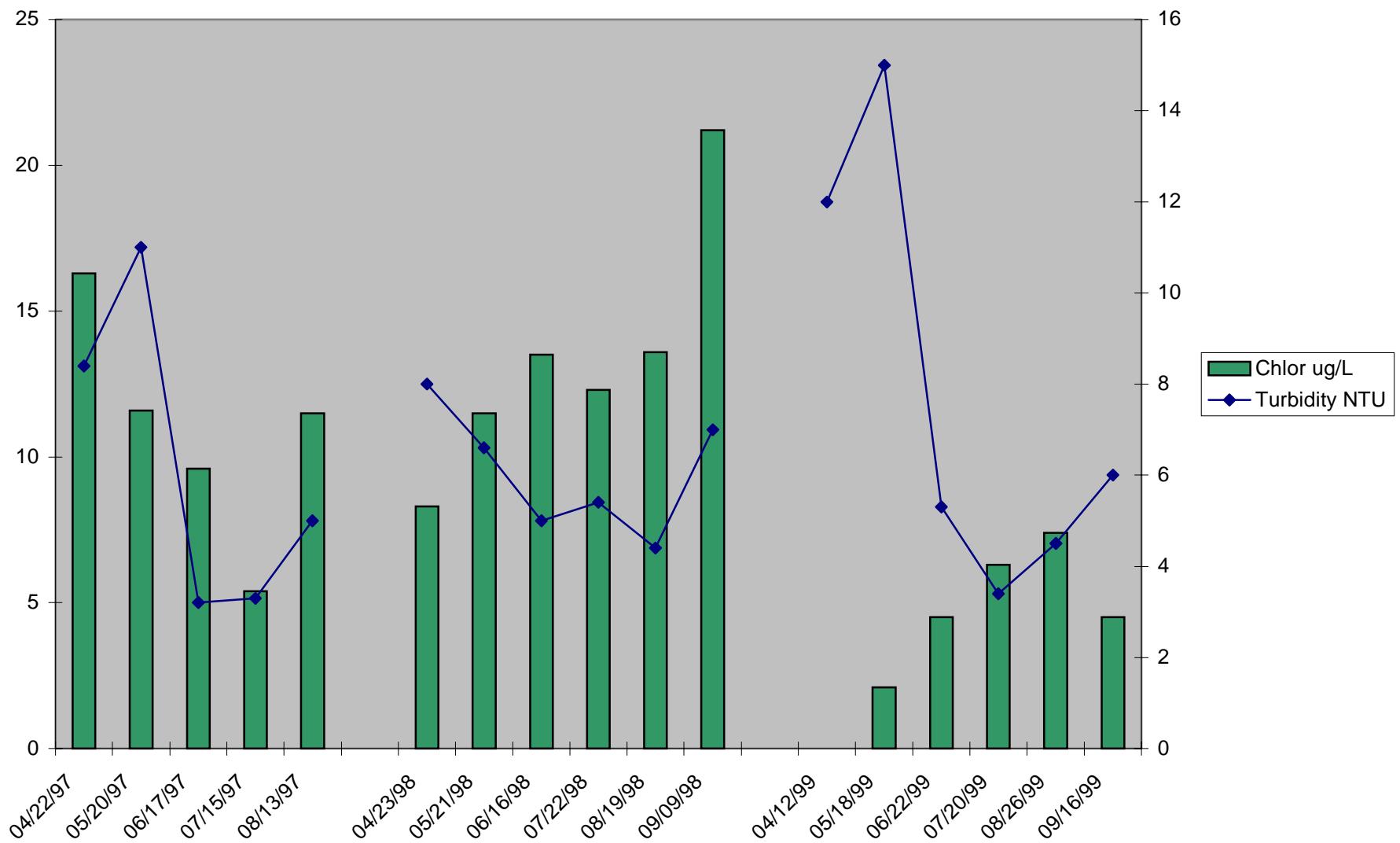


Figure 13. Camp Branch Arm (Sm-8) Chlorophyll and Turbidity Concentrations, 1997-1999

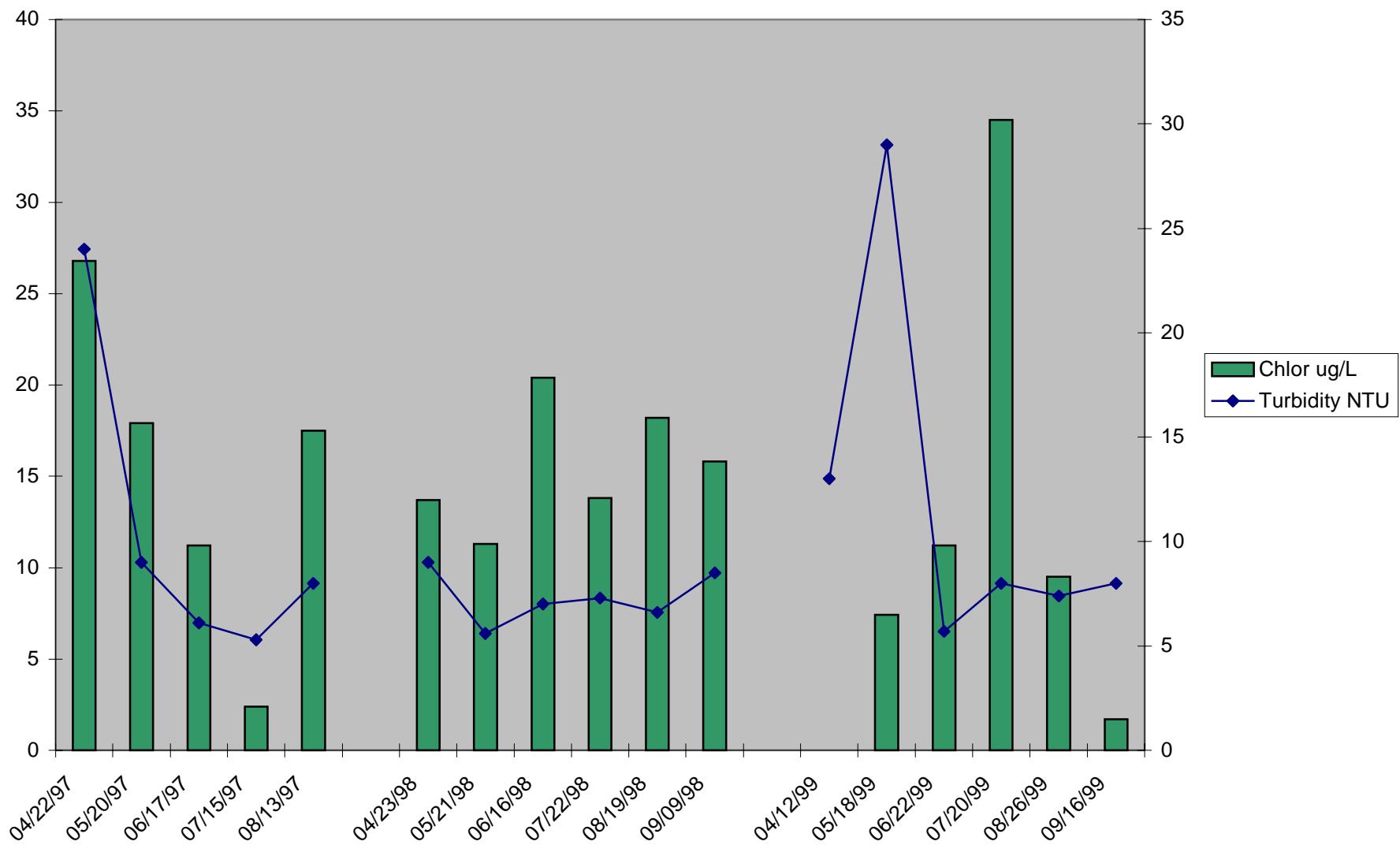


Figure 14. Little Platte Arm (Sm-14) Chlorophyll and Turbidity Concentrations, 1997-1999

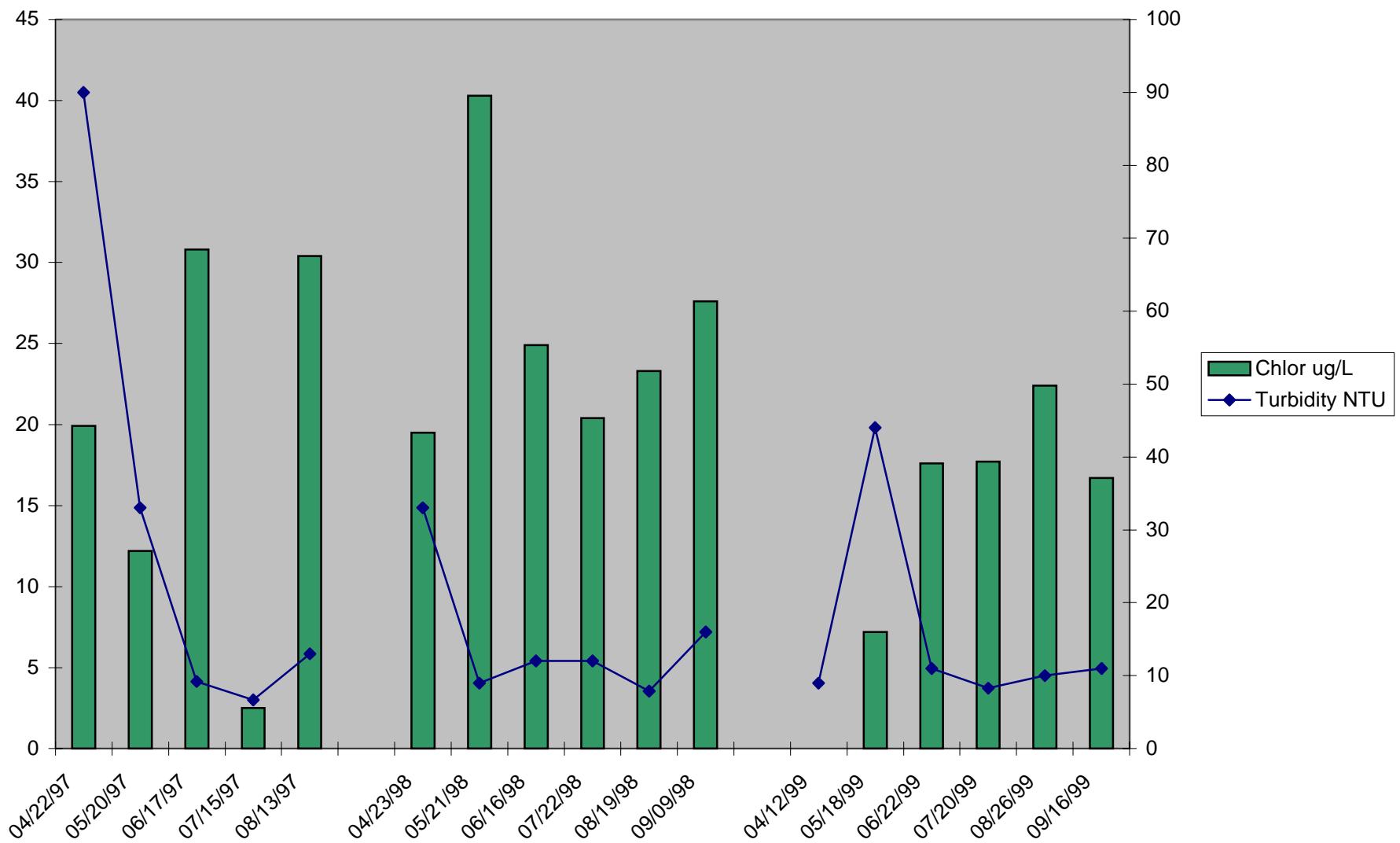


Figure 15. Down Lake Chlorophyll Concentrations and Secchi Depth

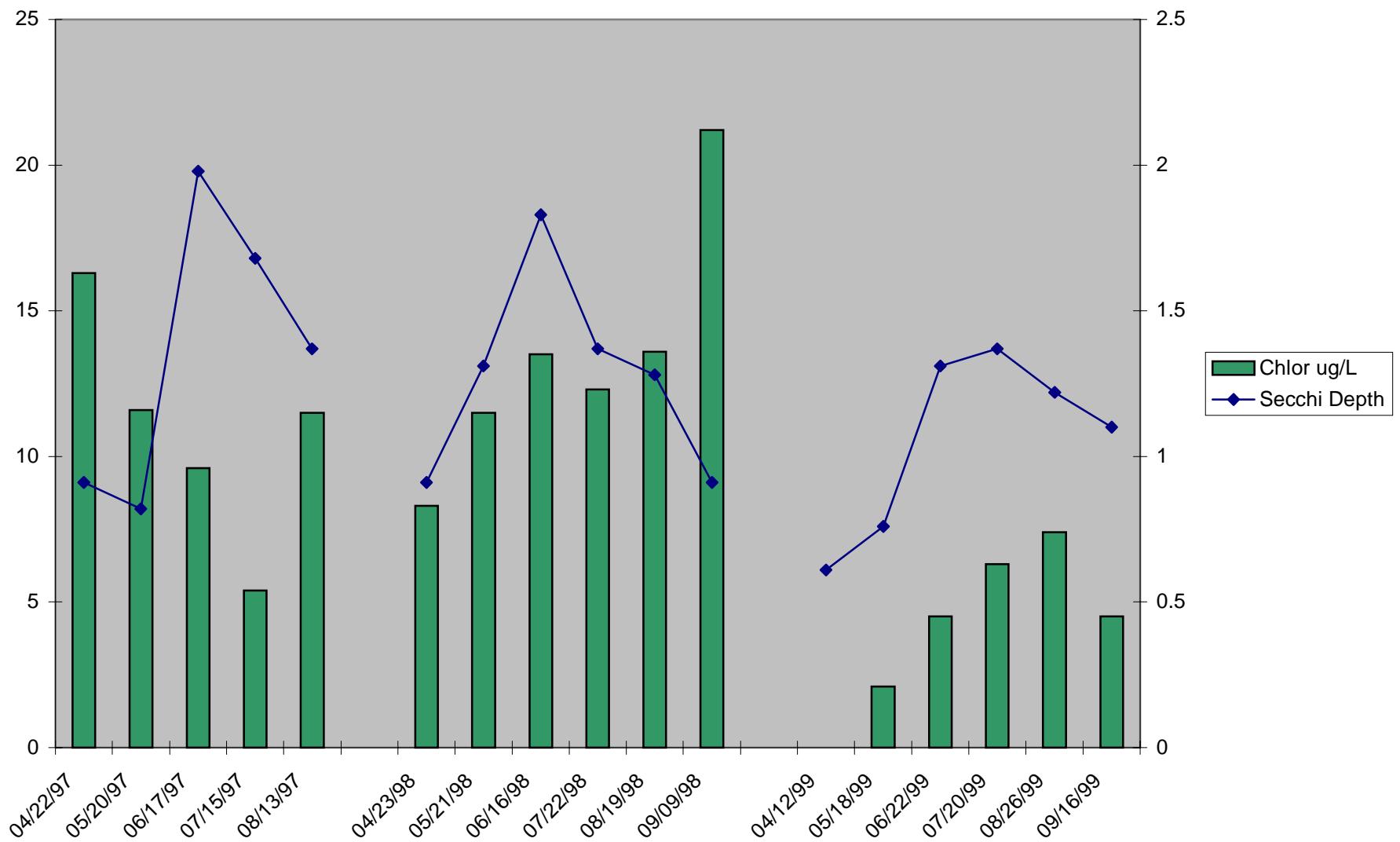


Figure 16. Camp Branch Arm (Sm-8) Chlorophyll Concentrations and Secchi Depth

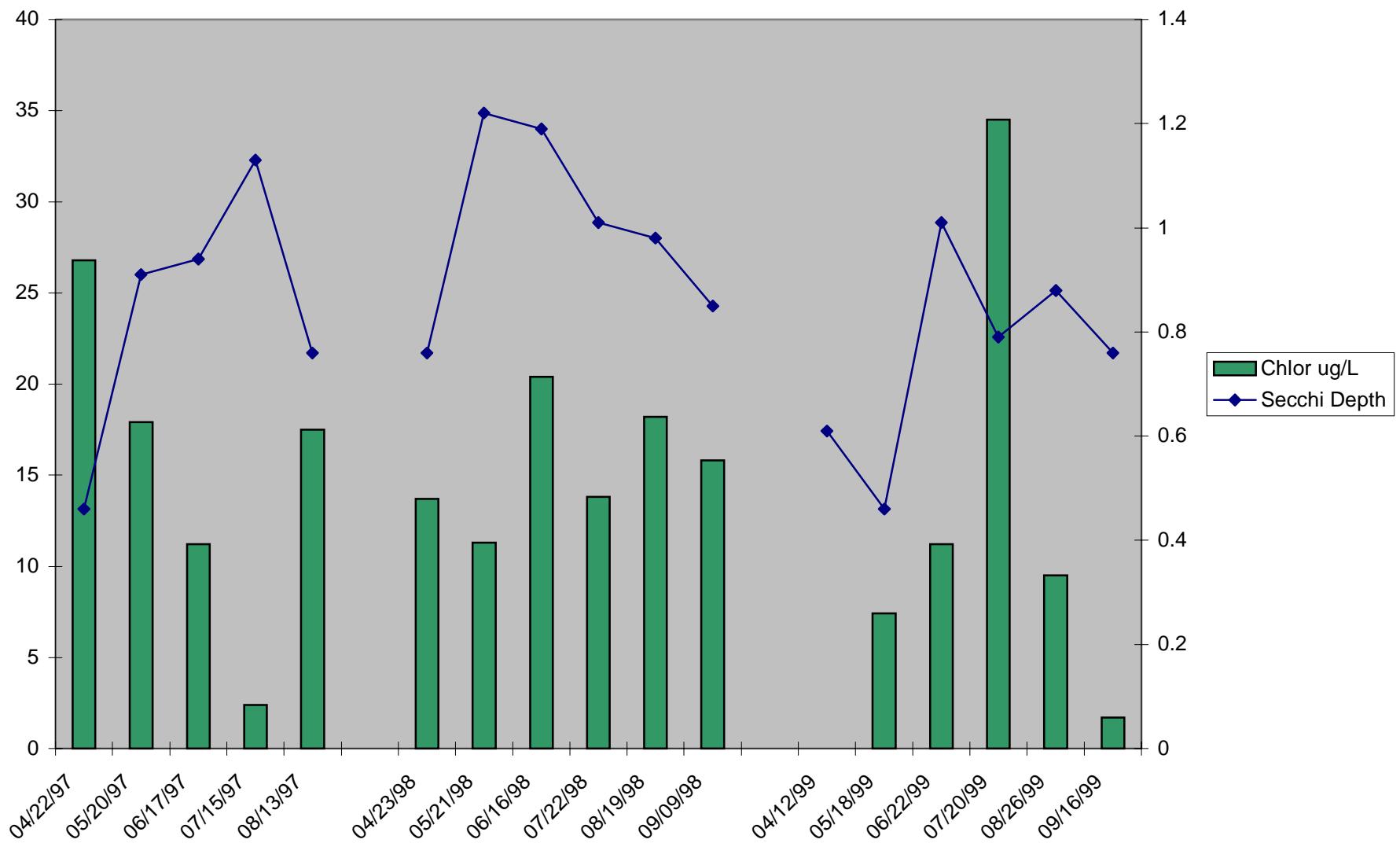


Figure 17. Little Platte Arm (Sm-14) Chlorophyll Concentrations and Secchi Depth

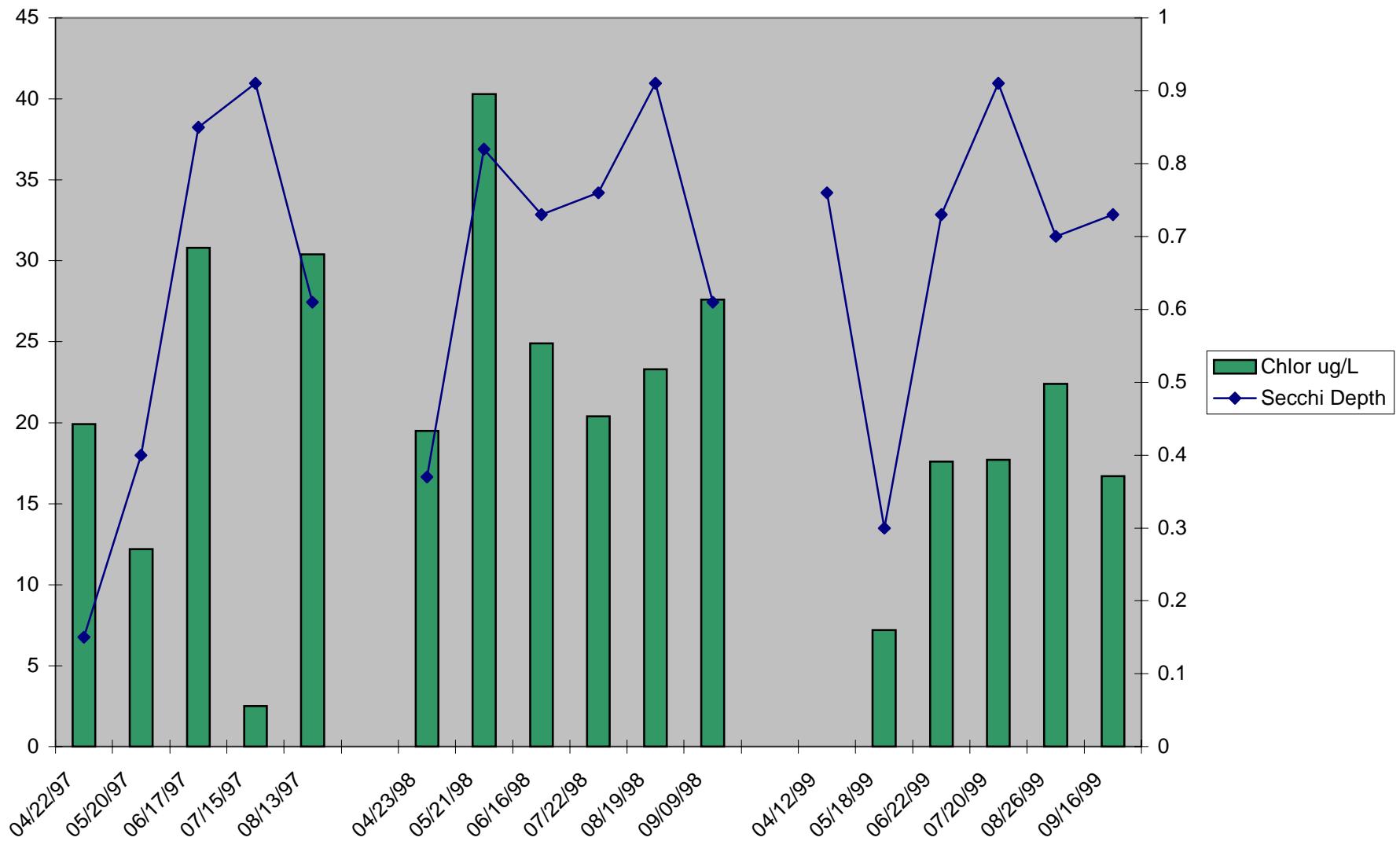


Figure 18. Down Lake Chlorophyll Concentrations and Photic Zone Depths

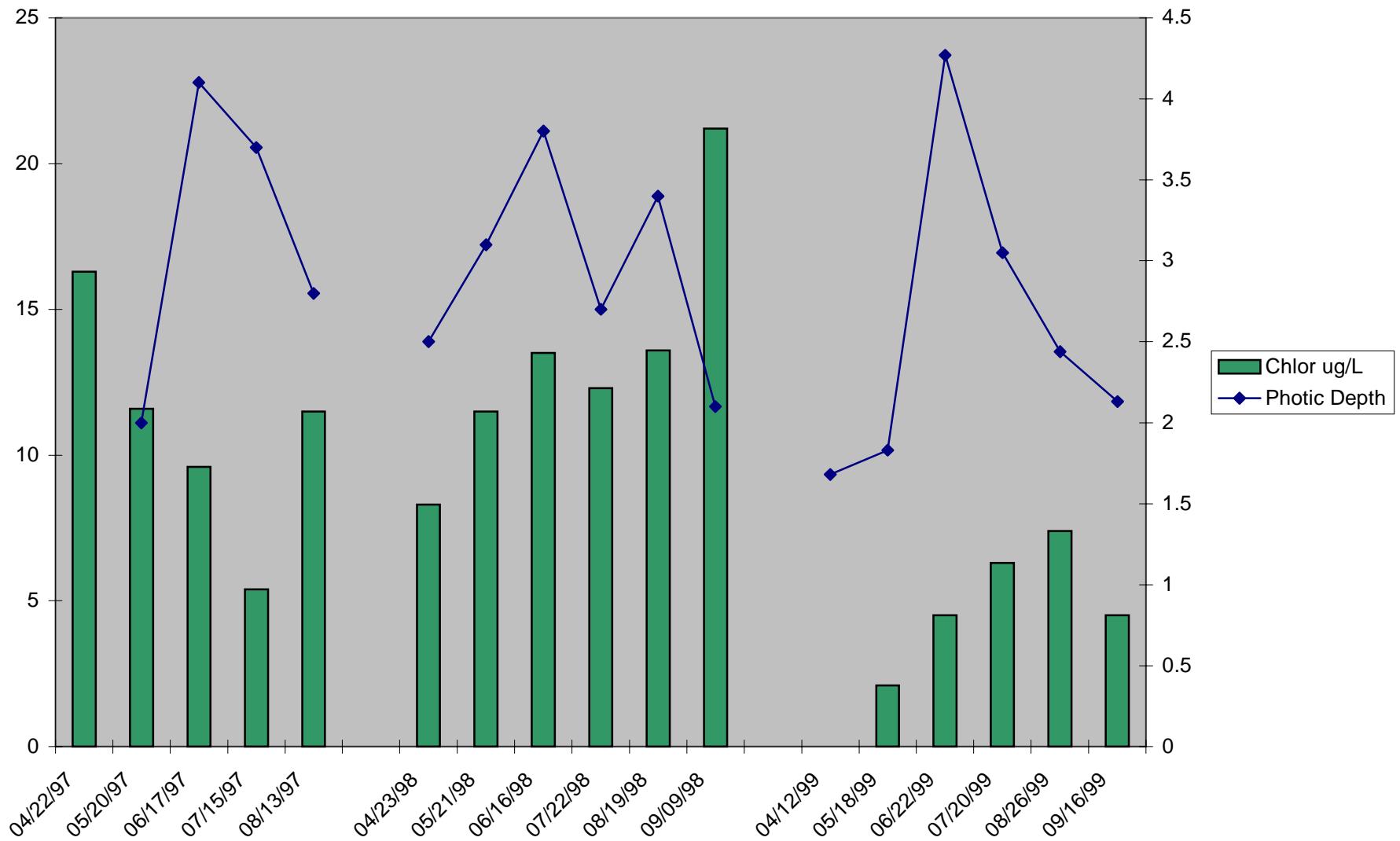


Figure 19. Camp Branch Arm (Sm-8) Chlorophyll Concentrations and Photic Zone Depths

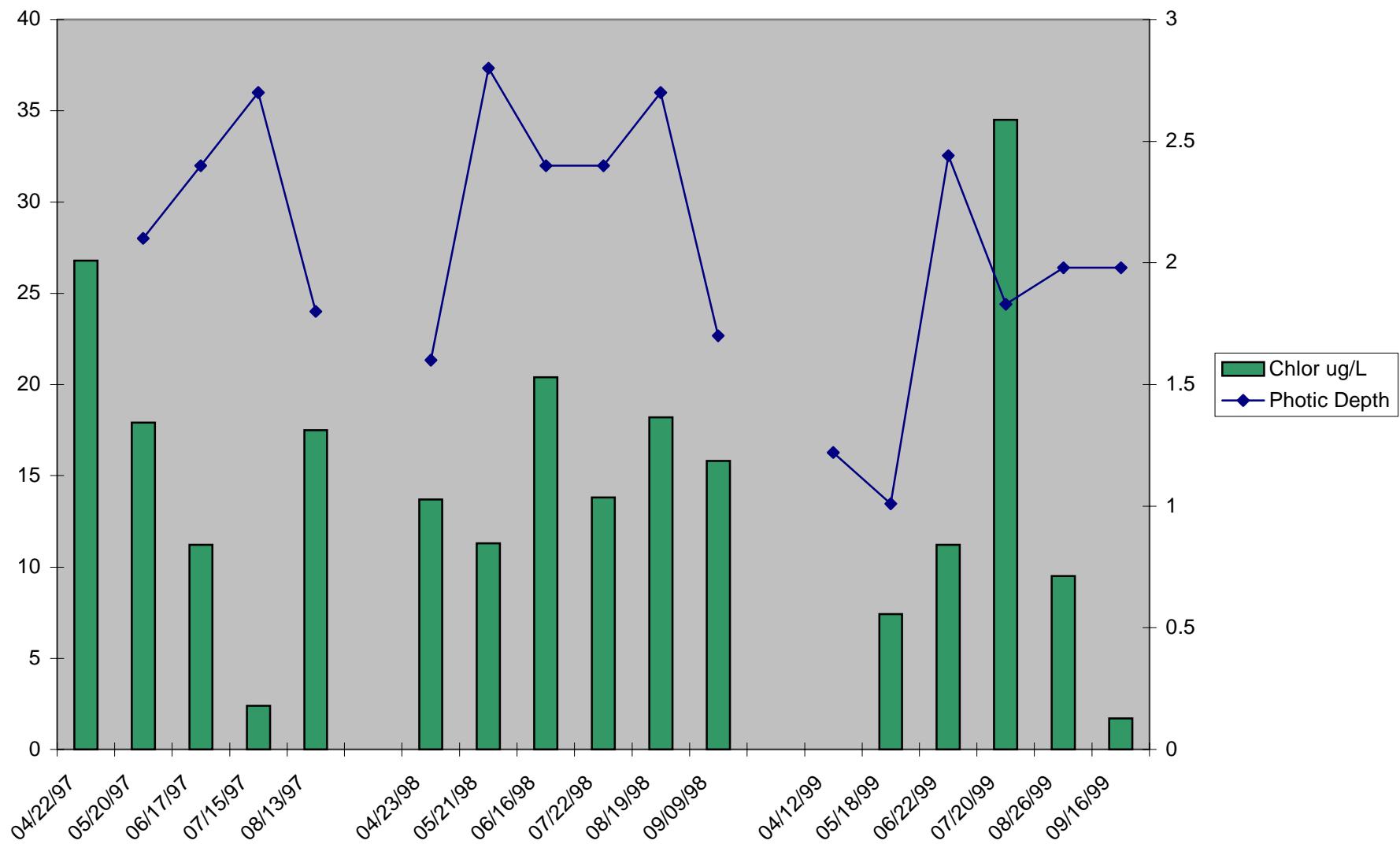


Figure 20. Little Platte Arm (Sm-14) Chlorophyll Concentrations and Photic Zone Depths

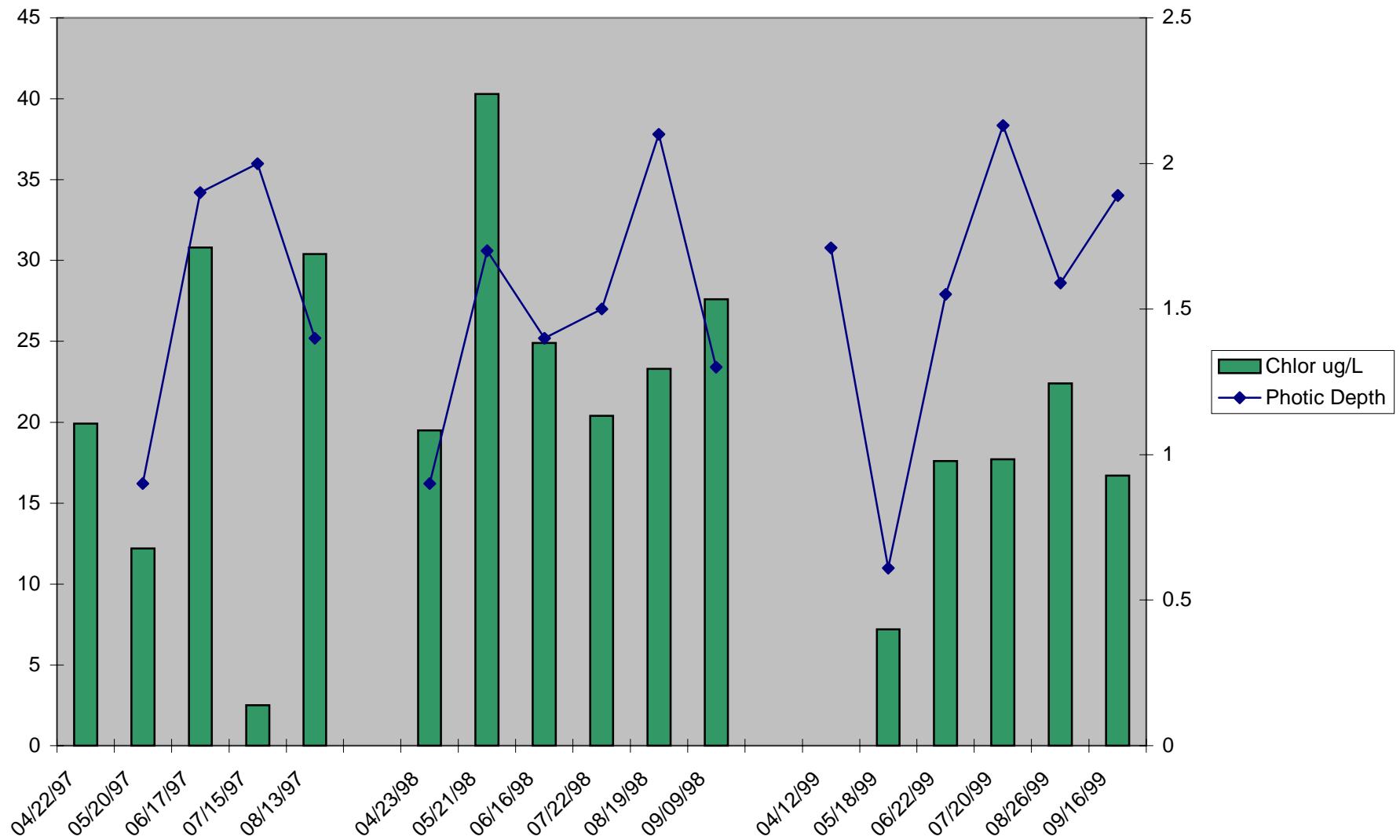


Figure 21. Down Lake (Sm-3) Atrazine Concentrations, 1997- 1999

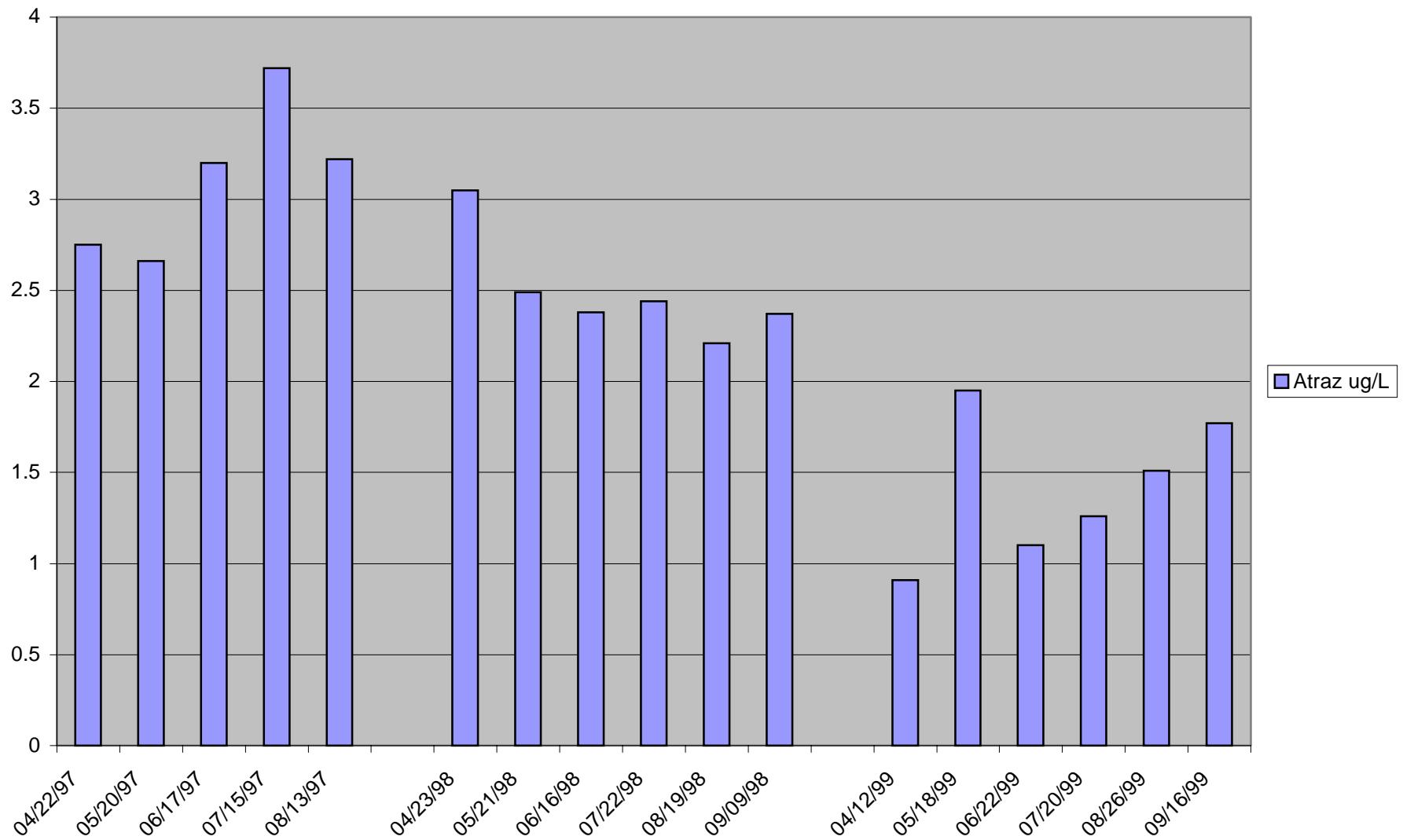


Figure 22. Camp Branch Arm (Sm-8) Atrazine Concentrations, 1997-1999

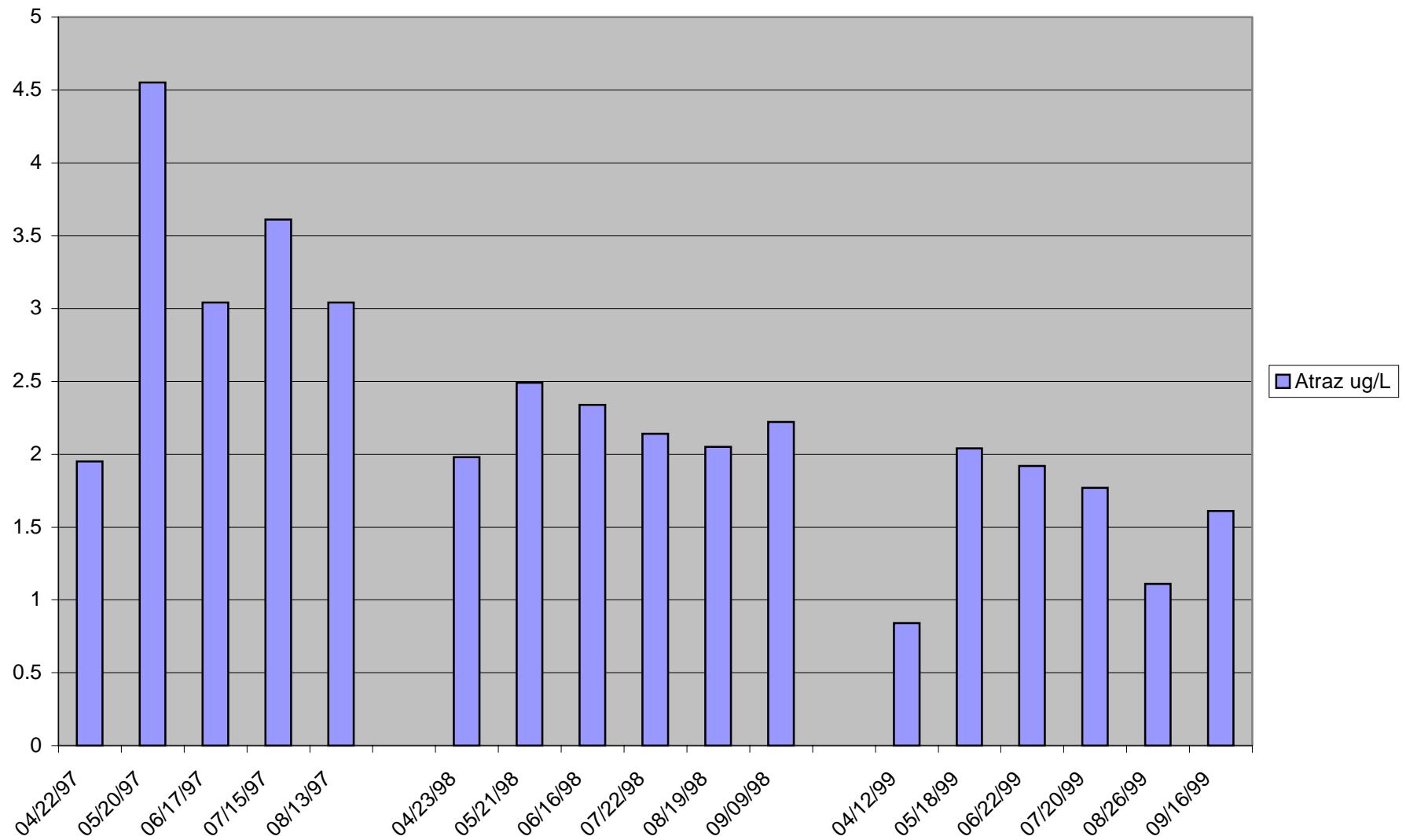


Figure 23. Little Platte Arm (Sm-14) Atrazine Concentrations, 1997-1999

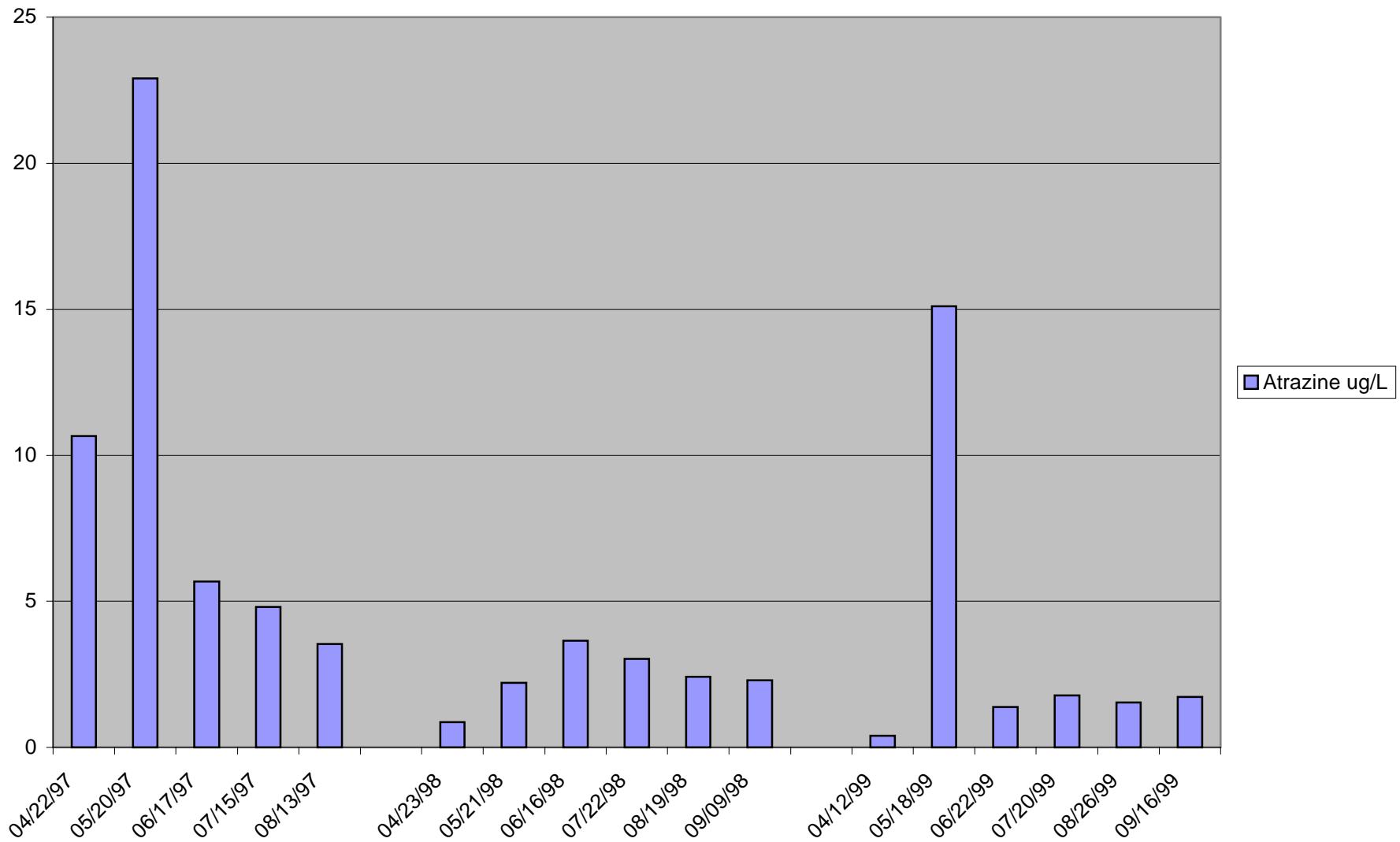


Figure 24. Outlet (SM-2) Atrazine Concentrations, 1997- 1999

